Dental Digest

July 1948

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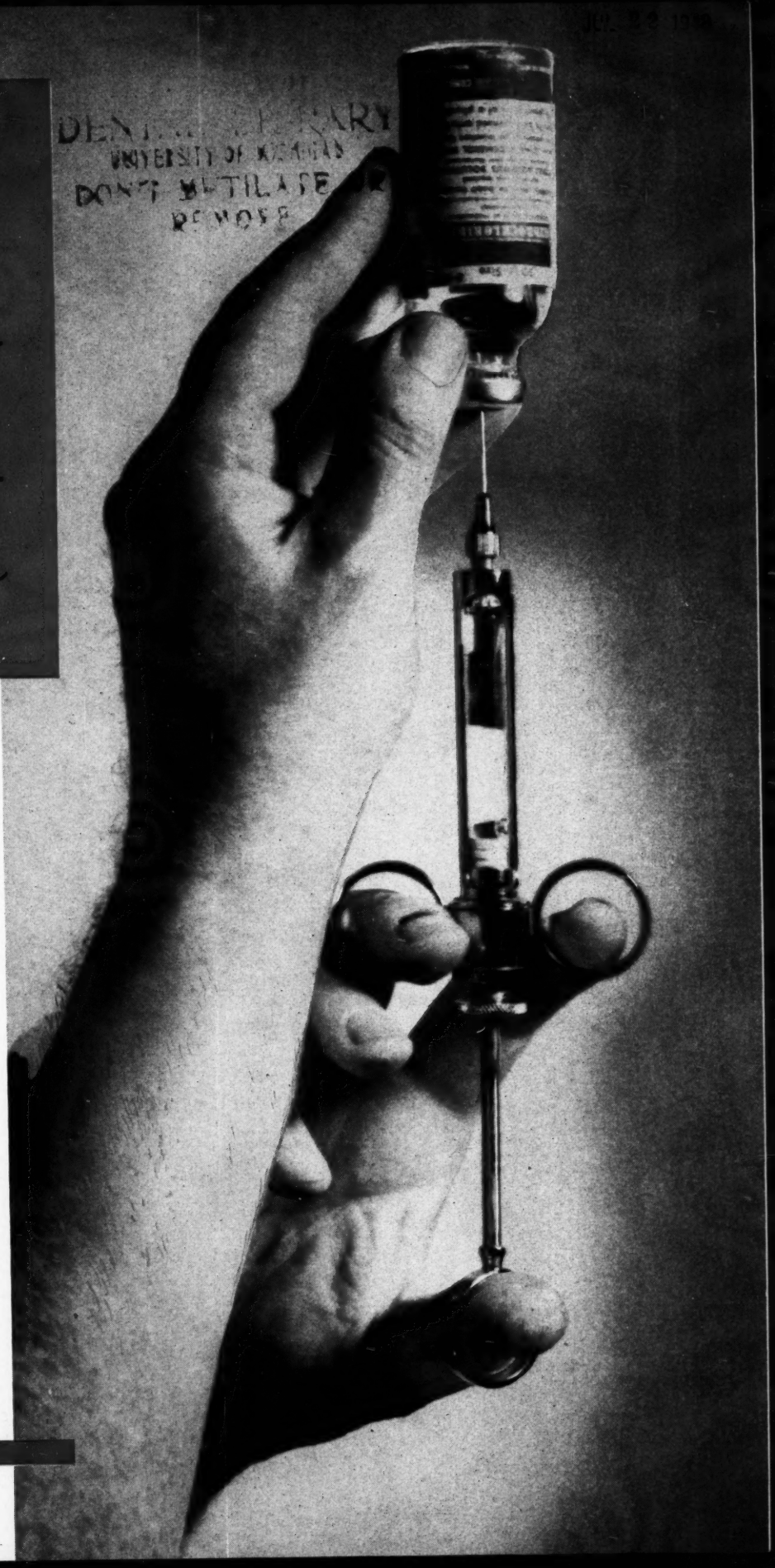

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About Our CONTRIBUTORS

JOSEPH S. LANDA, D.D.S. (Imperial University of Odessa, Russia, 1914; New York University College of Dentistry, 1925) has become identified with full denture prosthesis through his numerous writings in this field of dentistry. He has taught at the New York University College of Dentistry since 1925 where he is at present Clinical Professor of Dental Diagnosis. Previously he was Assistant Professor and Chief of the Prosthetic Clinic for eight years. BASIC PRINCIPLES IN SECURING RETENTION FOR FULL DENTURES represents Doctor Landa's third appearance in these pages.

RALPH H. BOOS, D.D.S. (University of Minnesota, College of Dentistry, 1929) is a prosthodontist. He has had a research interest in gnathodynamics for the past twelve years and has applied its principles in the case of FACIAL REHABILITATION reported this month. For the operative and surgical treatment of the case, he is indebted to Doctor John Wallace.

S. IRVING COPEN, D.M.D., presents the second of two articles on apprehension and anxiety in dentistry. The first appeared last month. PREMEDICATION BY CO-MEDICATION IN LOCAL ANESTHESIA is suggested as a means of relieving distressed patients. An analgesic-sedative is administered along with the local anesthetic.

WILLIAM I. OGUS, D.D.S. (George Washington University, 1917) is an oral surgeon whose special interest for a quarter of a century has been electrosurgical techniques. In the spring of 1946 a series of four articles he wrote on this subject appeared in the DIGEST. This month he discusses THE PLANNING OF INCISIONS to protect sound teeth in the surgical area against pocket formation and pain following surgery.

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Basic Principles in Securing RETENTION *for Full Dentures*

JOSEPH S. LANDA, D.D.S., New York City

DIGEST

The view is expressed that denture retention is not affected to a great extent by any particular standardized impression technique or material employed. Denture retention depends, rather, on the application of four basic principles:

1. Proper selection of the basal seat.

2. Utilization of a thorough knowledge of denture-supporting structures.

3. Adequate relief of sharp bony protuberances to assure intimacy of contact between the denture and retaining areas.

4. Balanced occlusion.

To the last of these is attributed a greater contribution toward retention than that made by all other factors combined.

MANY ATTEMPTS to secure optimum retention for full dentures are unsuccesful because they are based on a false premise; namely, that changing one's type of impression technique or impression material will improve denture retention. On the contrary, the operator who intelligently applies the basic principles relating to denture retention is capable of obtaining excellent results with *any* standard technique or material he may choose to master. Assuming he is skilled with his technique and material, one might say he will obtain the best possible retention by strict observance of these *basic principles*:

1. Outlining the proper area the denture is to cover, to secure the broadest possible seating surfaces.
2. Applying a thorough knowledge of the denture-supporting structures, to ensure maximum retention and stability.
3. Establishing intimacy of contact between denture and denture-bearing areas, to achieve maximum surface tension.
4. Creating a balanced occlusion, to press the dentures toward the bearing surfaces and aid adhesion.

These are broad headings and will now be discussed in greater detail.

Meaning of "Accurate Impression"

Definition—To obtain a proper outline of the bearing areas and maximum intimacy of contact, an accurate impression is required. A full denture impression may be defined as an imprint or counterpart of that portion of the oral cavity which will eventually be covered by the denture to be constructed. An impression, to be accurate, must copy fine lines, depressions, elevations, folds, and all other features of the area to be involved in the impression.

Perfection Impossible—The terms "perfect impression" and "perfect muscle-trimmed impression" are used too loosely, and become meaningless because of their abuse. A perfect impression in dental procedure does not exist, but may be spoken of only as the goal towards which the practitioner strives. The aim may be considered achieved if accurate impressions are obtained. Accuracy of the impression in representing the parts impressed is essential, and every effort should be made toward this end.

Tissue Consistency and Mobility—It would be less difficult to secure an imprint of living human tissues if they were all of the same consistency. Such is usually not the case. Almost every mouth has hard and soft areas, and, at times, even flabby mucosa in different regions of the oral cavity.

The greatest difficulty in securing accurate impressions in full denture prosthesis lies in the fact that the oral tissues must be reproduced with all their muscle attachments in functional condition. It is virtually impossible to portray living movable tissues accurately in impression material. The mobility of the muscle attachments in the oral cavity is extremely complex. As an impression material can reproduce only *one* position of the muscle at a time, it is *only* possible for that muscle to be in a particular state of function *or* in a state of relative rest.

Comfort the Goal—It is clear from the foregoing that there can hardly be any perfectly muscle-trimmed impression. The operator's paramount concern is, therefore, the reproduction of the particular position of function that will be most comfortable for the patient during speech and mastication of food.

Dentists should carefully analyze and study the muscle attachments in a state of rest as well as during function before deciding in what particular functional or relative rest position they wish the muscle attachments reproduced. The opera singer will have his jaws very far apart in singing, partly open in speaking, and in a more or less closed position during mastication of food. The denture borders cannot possibly be in perfect

contact with the muscle attachments in all their variable positions, but may be in a state of relative contact which will nevertheless give the patient comfort.

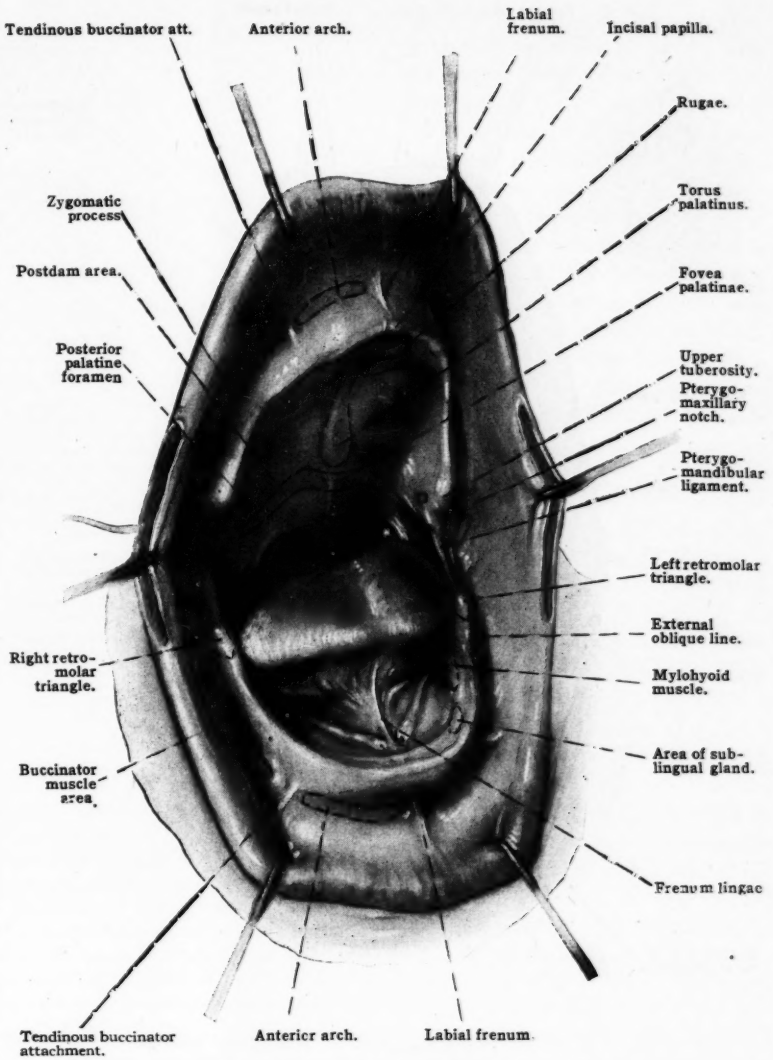
Relative Unimportance of Techniques and Materials

One operator may secure as accurate an impression by means of the open mouth technique as another will secure of the same tissues by means of the closed mouth technique. Of importance is *not* the particular technique used, but how well it is executed. Of greater importance is the operator's ability to analyze the tissues in the oral cavity and correlate intelligently all the factors present before an impression is taken. *It is essential above all* (1) *to determine the region upon which the denture will be built;* (2) *to attempt to cover as large an area as possible.* (The dentist must not impinge upon movable muscle attachments, however, for impingement would have an adverse effect upon denture stability.) The ideal rule for extension of full dentures is to build the denture on the entire region that belongs to the denture plot but not to overextend it onto the soft palate, the tongue, or the anterior pillars of the fauces.

The choice of impression material is often a problem. As has been emphasized above, this is of secondary importance. Modeling compound is good in the hands of one operator; another operator may get better results by using plaster as his impression material; a third operator gets best results by using a zinc oxide and eugenol compound. *It is of little importance what particlar impression material is used, so long as the operator is thoroughly familiar with its physical and mechanical properties and has acquired skill and digital dexterity in handling it.*

Anatomy of Upper Jaw

It is impossible to obtain a maximally retentive denture without possessing and utilizing a thorough knowledge of the denture-supporting structures. It is essential, therefore, to review the anatomy and physiology of the edentulous oral cavity. Let us begin with those tissues that are situated in the median sagittal plane of the head, dealing first with structures found in the upper jaw.



1. ***(Photographs—Miller, Samuel Charles: Oral Diagnosis and Treatment, ed. 2, Philadelphia, The Blakiston Company, 1946.) Tongue raised, mouth opened to show positions assumed by muscle attachments and landmarks of oral cavity.***

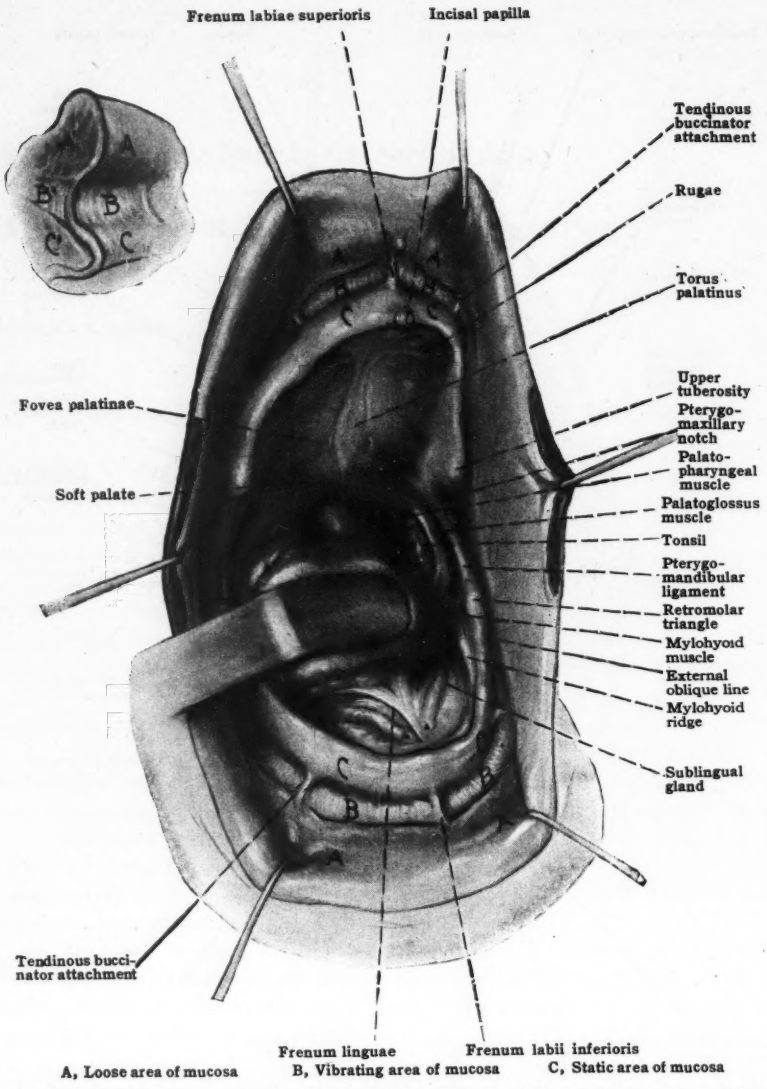
1. The *frenum labii superioris* is a muscle attachment that is located on the labial surface above the region of the maxillary central incisors (Figs. 1 and 2). In different mouths it may vary from a string-like attachment to one of a fanshape.

2. Distally from the labial frenum on either side is situated the *tendinous attachment of the buccinator* in the region of the bicuspids.

3. Between the frenum labii and the tendinous buccinator attachment is situated the *anterior,* or orbicularis oris, *arch* (Fig. 1). The muscle attachments are usually not tense in this area and the denture flange may be fully extended.

4. The *middle,* or zygomatic, *arch* extends from the tendinous buccinator attachment to the anterior border of the postmalar pocket. Since the denture here comes into contact with the resistant zygomatic process (Fig. 1), vertical overextension is undesirable.

5. The *posterior,* or tuberosity,



2. ***Mouth wide open, tongue displaced laterally to show positions assumed by muscle attachments and landmarks of oral cavity.***

arch is situated between the posterior border of the zygomatic arch and the most distal portion of the maxillary tuberosity. The vestibulum oris is usually wide in this region and should be completely filled with impression material.

6. The posterior border of the tuberosity arch merges with the *pterygomaxillary notch* (Fig. 1). This notch is situated between the posterior border of the maxillary tuberosity and the anterior surface of the pterygoid process of the sphenoid bone.

7. Between the right and left pterygomaxillary notches is situated the *axis of rotation of the soft palate.* This axis is variously shaped (seldom as a perfectly straight line), and is situated at the junction of the hard and soft palates.

8. In the median line of the maxillary vault there is usually found a bony projection of variable size and shape called the *torus maxillaris* (or palatinus) (Fig. 1).

9. In the most anterior portion of the maxillary vault, just distal to the crest of the ridge in the median line, is situated the anterior *palatine foramen* (F in Fig. 3). It is covered with only a thin layer of soft tissues and should be generously relieved.

10. In the most posterior portion of the maxillary vault, in the region of the junction of the hard and soft palates on either side and very close to the median line, are placed the *fovea palatinae* (Fig. 1) which serve as a guide for posterior extension of the upper denture.

11. The *posterior palatine foramina* are situated just inside of the alveolar arch on either side of the upper tuberosities. These foramina need not be relieved as they are covered with a thick layer of soft tissues.

The Lower Denture

1. In the lower denture, between the frenum labii inferioris and the tendinous buccinator attachment, is situated the *anterior*, or orbicularis oris, *arch* (Fig. 1).

2. Between the tendinous buccinator attachment and the anterior fibers of the masseter muscle, is situated the *middle*, or buccinator, *arch.*

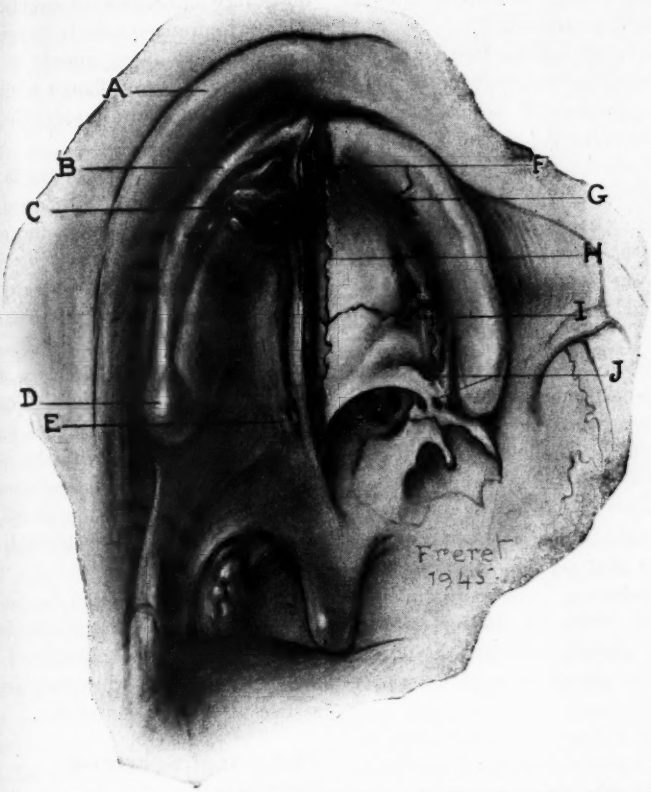
3. Between the posterior end of the middle arch and the posterior end of the retromolar triangle, is placed the *posterior*, or retromolar, *arch.*

4. On the inner, or lingual surface of the mandibular ridge, just opposite the frenum labii, is found the *frenum linguae.* This frenum is exceedingly active, usually is fan-shaped, and controls various movements of the tongue. It is important, therefore, not to overextend the denture in this area.

Structures of the Floor of the Mouth

To achieve the most advantageous extension of the lingual border of the denture, it is necessary to have a working knowledge of the anatomy and physiology of the structures comprising the so-called floor of the oral cavity, as well as a knowledge of their importance in denture construction. The following are the structures that are of greatest interest to us in this discussion:

1. The genioglossus muscle
2. The geniohyoid muscle
3. The sublingual gland (Fig. 2)
4. The submaxillary gland
5. The mylohyoid muscle (Fig. 1)
6. The palatoglossus muscle (Fig. 2)



3. ***The anterior palatine foramen must be generally relieved so that the denture will not impinge upon the nerves and blood vessels that come through this foramen. Excessively hard rugae should also be carefully relieved.***

The posterior palatine foramen need not be relieved as it is covered with a thick layer of soft tissue. This soft tissue prevents the denture from compressing the nerves and blood vessels against the bony substance of this foramen.

A, Lip; B, ridge; C, rugae; D, tuberosity; E, fovea palatina; F, anterior palatine foramen; G, anterior palatine or premaxillary suture; H, median palatine suture; I, posterior or transverse palatine suture; J, posterior palatine foramen.

The *genioglossus muscle* arises from the upper pair of the genial tubercles and is inserted into the muscles of the tongue and hyoid bone. This powerful muscle is situated in the middle of the floor of the mouth and controls the most important movements of the tongue. In some rare instances it is found to be very short and the patient's tongue movements are extremely limited in certain directions. The genioglossus muscle lies just beneath the mucosa, and its wide range of movements can be easily felt digitally when the muscle is active. In full denture wearers, this muscle adapts itself to a narrow range of movements that are essential to phonetics, mastication of food and deglutition. Overactivity of the tongue during the process of impression-taking is contraindicated because it tends to underextend the lingual flanges of the impression and in this way reduces the retention of the finished lower denture.

The *geniohyoid muscle* arises from the lower pair of genial tubercles of the mandible and is inserted into the hyoid bone. It is situated in the middle of the floor of the mouth below the genioglossus and above the mylohyoid muscles. This group of muscles raises the base of the tongue by raising the hyoid bone during the process of deglutition.

On either side of the genioglossus muscle in the anterior portion of the floor of the mouth and above the mylohyoid muscle is situated the *sublingual gland* (Fig. 1). This structure, when functioning normally, is soft and flexible and does not offer perceptible resistance to contact with the lingual flange of the lower denture.

The upper portion of the *submaxillary gland* is situated behind the sublingual gland and above the mylohyoid muscle. The posterior and larger portion of the submaxillary gland is situated behind and below the mylohyoid muscle. The duct of the submaxillary gland (Wharton's duct) extends to the median line and in a forward direction along the side of the genioglossus muscle and the sublingual gland.

Deep vertical overextension of the lingual flange of the lower denture is contraindicated in the area of the origin and initial flow of *Wharton's duct,* as compression of the latter by the denture border may cut off the outflow of saliva from the gland, causing it to become considerably distended and swollen.

The *mylohyoid muscle* (Fig. 2) is triangular in shape and forms, with the muscle of the opposite side, the floor of the oral cavity. It takes its origin from the mylohyoid ridge extending from the median line of the mandible anteriorly, to the wisdom tooth posteriorly. This muscle may be considered clinically as being moderately tense and resistant; therefore, slight overextension is at times permissible and is to be preferred over slight underextension.

The *palatoglossus muscle* (Fig. 2) is a long and narrow muscle covered with mucous membrane. It arises from the soft palate on either side of the uvula and is inserted into the side of the tongue. When the tongue moves into a forward or lateral position, the palatoglossus muscle follows in the same direction. This muscle, therefore, takes part in the formation of the posterior boundary of the lingual flange of the lower denture.

The *buccinator muscle* (Fig. 2) is broad and quadrilateral in shape. It forms the bulk of the cheeks and arises from the outer surface of the alveolar process in the region of the upper and lower molars. Posteriorly it is attached to the anterior surface of the pterygomandibular raphe

which separates the buccinator muscle from the superior constrictor of the pharynx. The buccinator fibers converge forward to the angle of the mouth where they intersect each other, the upper fibers becoming continuous with the lower segment of the orbicularis oris and the lower buccinator fibers with the upper segment of the orbicularis oris.

The buccinator muscle usually manifests only very slight tenseness and offers little resistance to digital displacement. It is, therefore, permissible in most cases, to extend the buccal flange of the lower denture in such a manner as to form the broadest possible seating surface for the denture bases. (We must always bear in mind the basic principle that the wider the area covered by the denture, the greater the retention; and, also, the greater its resistance to occlusal stresses.)

Functional Changes in the Floor of the Mouth

To determine the most desirable position of the structures in the floor of the mouth for purposes of impression-taking, one must study these structures in function.

Positions of Muscles—When examined with the mouth wide open, the muscles are found in such a state of tension that most of the other structures of the floor of the mouth are considerably displaced from their original position of rest. Let us analyze the positions the muscles of the oral cavity assume in a state of complete rest, in average normal activity, and in a state of extreme active tension.

1. The muscles of the oral cavity are in a state of *complete rest* when the lips are in contact without strain and the occlusal surfaces of the upper and lower teeth are about 2 to 3 millimeters apart from one another. The tongue rests on the floor of the mouth and occupies the whole oral cavity.

2. The widest possible jaw separation would represent the muscles of the oral cavity in a state of *extreme tension*. The muscles of the tongue are in a state of extreme tension when the tongue is in an extreme anterior or lateral protrusion.

3. Average *normal activity* of the muscles of the oral cavity corresponds to an opening of the jaws with a space between the central incisors of a little over one-half inch. The muscles of the tongue are in a state of average activity when the tip of the tongue is placed between the upper and lower lips, anteriorly, and at the right and left corners of the mouth laterally.

Preferred Postion for Lingual Flange—Experimentation and practical experience have indicated that conservative muscle activity will give the most satisfactory results in denture prosthesis. In taking an impression for the lingual flange of the lower denture, that position of the mylohyoid muscle is preferred which it occupies when the tongue is protruded slightly, and the tip of the tongue is placed between the upper and lower lips.

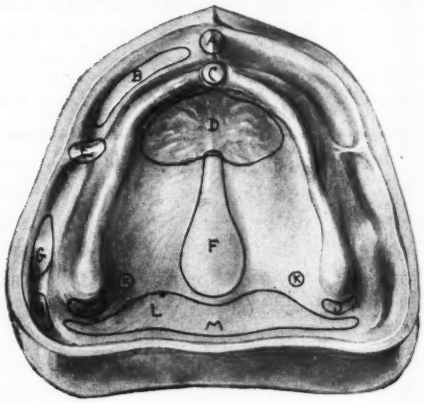
When the mouth is wide open, the tongue retracts downward and backward into the throat, with the mylohyoid muscle following about the same course and descending in a downward and backward direction. If a lower impression were to be secured with the mylohyoid muscle in this position, the lingual flange would be overextended considerably in the same direction.

Similarly, when the tongue is considerably extended in a forward, upward, or lateral direction, the mylohyoid muscle assumes an extremely distended position in a forward and upward direction. In this state of tension, the mylohyoid muscle contracts about 3 to 4 millimeters above the mylohyoid ridge. If an impression were secured for the lingual flange of the lower denture with the mylohyoid muscle in this state of upward distension, the impression of the lingual flange would be considerably underextended.

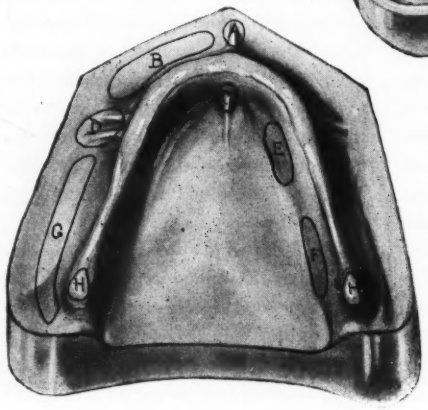
Experience teaches that the lingual flange of the lower denture should be in contact with the muscles of the floor of the mouth when they are in a state of average contraction.

The Basal Seat and Retention

In order properly to comprehend the forces that hold the dentures in



4. ***Anatomic landmarks on upper stone cast. A, Labial frenum; B, anterior arch; C, incisal papilla; D, rugae; E, tendinous buccinator attachment; F, torus palatinus; G, zygomatic process; H, buccal space; J, pterygomaxillary notch; K, posterior palatine foramen; L, postdam area; M, fovea palatinae.***



5. ***Anatomic landmarks on lower stone cast. A, Labial frenum; B, anterior arch; C, lingual frenum; D, tendinous buccinator attachment; E, area of sublingual gland; F, mylohyoid muscle; G, buccinator muscle; H, retromolar tubercle.***

position during periods of absence of the factors of occlusion, it is necessary to be fully familiar with the basal seats of the dentures and their associated structures. *The area covered by the denture is called the basal seat.* This denture foundation consists of a bony framework covered with soft tissues of variable consistency called the mucous membrane. The latter is made up of an upper layer of stratified squamous epithelium and underlying it is the submucosa which consists of white and elastic connective tissue fibers enmeshing the larger blood vessels and nerves. The firmness, thickness and consistency of these soft tissues vary at different parts.

Upper Basal Seat—In the upper basal seat, the soft tissues covering the ridges and the torus palatinus are usually thin and unyielding. The soft tissues in front and back and on both sides of the torus palatinus (when the latter is situated in the center) are thicker and more yielding.

1. The yielding soft tissues of the palatal vault form the *retaining area* of the artificial dentures.

2. The alveolar ridges with their thin soft tissue covering afford mainly the *supporting areas* for the dentures.

3. In addition, the areas of the zygomatic processes, opposite the first upper molar region, when adequately extended in width (or even slightly overextended horizontally), afford the *stabilizing areas* for the dentures.

Lower Basal Seat—The lower basal seat does not, understandably, afford nearly as good a retaining area for the lower denture.

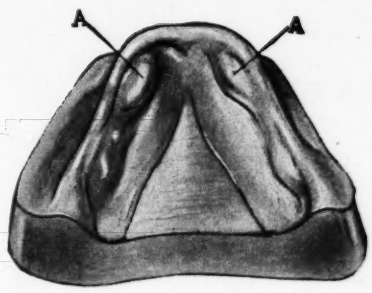
1. The chief *retaining elements* for the lower denture are afforded by:

a) The thick soft tissue of the retromolar area.

b) A wider than average peripheral contact of the lingual flange of the lower denture with the muscles of the floor of the mouth (particularly in the pockets situated between the base of the tongue and the left and right ascending ramus).

c) A good peripheral seal.

d) Creating the closest possible intimacy of contact between the lower denture base and the soft tissues of the alveolar process.



6. ***The torus mandibularis should, where necessary, be carefully relieved and the border of the lingual flange of the lower denture should never terminate upon the torus mandibularis but should always extend way below it to contact the soft tissues of the floor of the mouth. The arrows "A and A" point to the right and left tori mandibularis.***

2. The lower alveolar ridges afford mainly the *supporting areas* for the lower dentures.

3. The hard bony areas to the buccal of the first lower right and left molar region, if adequately extended (or even slightly overextended horizontally), afford the *stabilizing areas* for the lower dentures.

Importance of Intimacy of Contact

Inasmuch as retention in both the upper and lower dentures is mainly derived from *contact adhesion* and as adhesion, according to elementary laws of physics, is mainly dependent upon intimacy of contact, undivided attention should be focused on this factor.

To achieve maximum adhesion, it is imperative to relieve carefully any sharp bony protuberances that are found to be present on the basal seat. When the hard areas are either ignored or inadequately relieved, the dentures cannot settle uniformly upon their supporting structures. In consequence, intimacy of contact between the denture and the *retaining areas* is completely lost.

It follows, then, that regardless of which impression technique is used, the *torus palatinus* and *torus mandibularis* should be adequately and scientifically relieved. The *torus palatinus* varies greatly in size, shape, and form in all three dimensions (Fig. 2) and as it is very hard and resistant to change, it invariably (if left unrelieved) becomes a fulcrum upon which the denture rotates in anteroposterior and lateral directions. This teetering of the denture represents a great hindrance during the process of mastication.

Balanced Occlusion and Retention

Not the least important factor in retention of dentures is a balanced occlusion. It may be stated that balanced occlusion contributes more toward retention of upper and lower dentures than all the other factors combined.

1. A good occlusion tends to press the upper denture upward and the lower denture downward creating intimacy of contact between the dentures and the mucosa; and as a result of this leads to better adhesion.

2. A good occlusion tends to maintain the peripheral denture borders in contact with the soft tissues, and, in doing so, prevents the entrance of air between the inner surface of the denture and the mucosa.

3. A correctly balanced occlusion maintains the underlying bony structures and mucosa in good health, and in this way preserves stability for many years.

Summary and Conclusion

1. The particular impression technique or material employed is of no great importance in the retention of full dentures. Skill in applying the technique and in handling material is of far greater significance.

2. The basic principles relating to denture retention should be adhered to at all times.

This discussion deals with only one phase of denture prosthesis; namely, retention. Inasmuch as lack of retention is detrimental to the other three features of denture prosthesis—esthetics, phonetics and mechanics, it follows that when an artificial denture lacks retention, it becomes a useless fixture in the oral cavity.

136 *East Fifty-fourth Street.*

Facial REHABILITATION

RALPH H. BOOS, D.D.S., Minneapolis

DIGEST

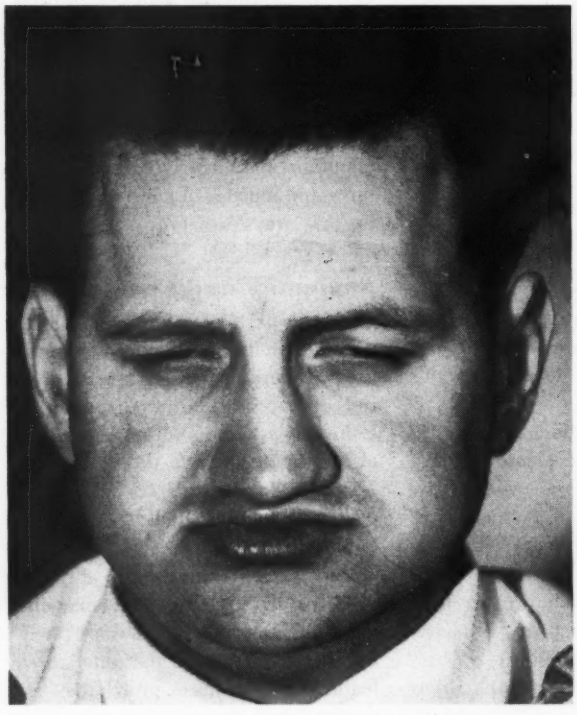
Dental conditions are often social or psychologic handicaps. Increasingly, dentists are recognizing and accepting their opportunity to overcome these obstacles to personal happiness; they are resorting to dental treatment varying from minor prosthetic, orthodontic, or surgical procedures to full mouth reconstruction.

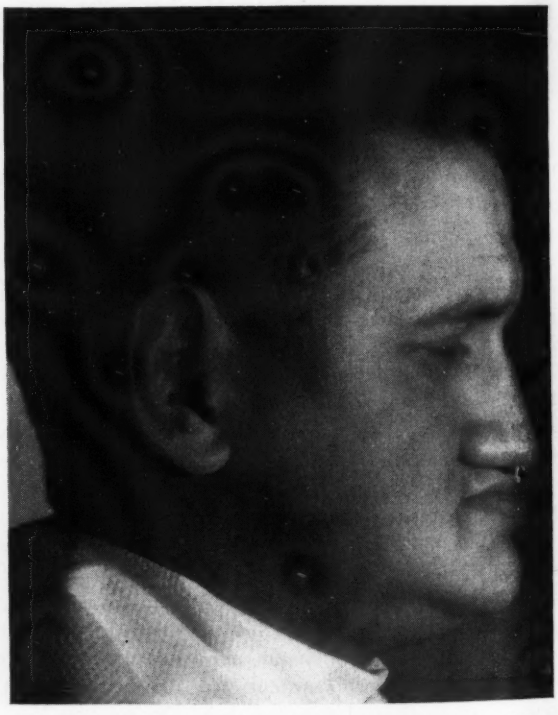
A commendable application of this point of view toward dental treatment is described in this illustrated report of facial rehabilitation. The patient, a young man twenty-two years of age, was physically and psychologically affected by an extreme malocclusion. The extent of the abnormality was such that he could not masticate his food properly and felt himself to be a social outcast because of his appearance.

The relation of the mandible to the maxilla had been distorted. The correction of the intermaxillary relation was the basis for restoration of the facial contour to as nearly normal a condition as possible.

1. To establish the intermaxillary relation, the vertical dimension is registered as the first step. This may be accomplished by any one of a number of techniques and measurements. If there is room enough for a gnathodynamometer, the maximum force minus three millimeters is studied. The measurement from the rest position of the mandible is approximately the same as maximum force and is often more convenient for dentulous cases. The maximum vertical opening which can be used is rest position or maximum force minus three millimeters.

(To obtain the rest position of the mandible, the jaw is permitted to hang in a relaxed position; the lips are held lightly together, if convenient. Some pa-





1. ***Front view of patient before start of rehabilitation. No effort was made to pose the picture.***

Note mouth, nose, and the general disposition as evidenced by the appearance of eyes and forehead. The patient was highly skeptical about the esthetic and functional possibilities of dental treatment to improve his condition.

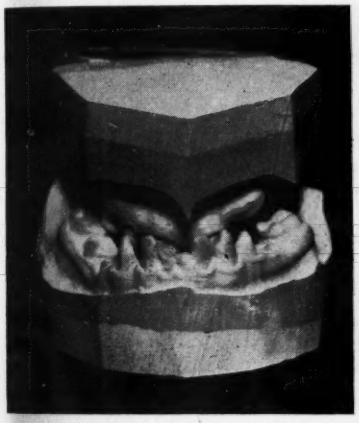
2. ***Profile view of patient before rehabilitation was started. Upper lip is forced against the nostrils. Symphysis of the jaw is in line with tip of nose. Note forehead and eyes.***

tients may require considerable practice to achieve this position.)

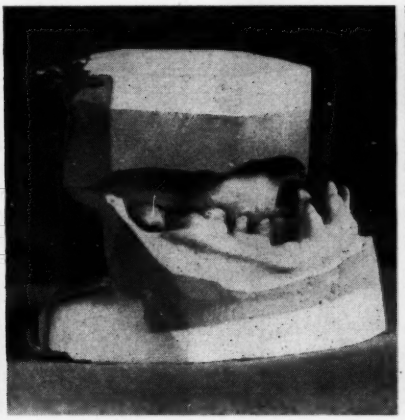
2. Following the establishment of the vertical dimension, the centric relation is registered. Up to the present time, the Gothic arch tracing has been recognized as the most scientific approach to this registration. The apex of the Gothic arch is used as the centric position. Various devices may be employed to make the Gothic arch tracing. If teeth are present, it is best for the devices to be tooth-bearing.

808 *Nicollet Avenue.*

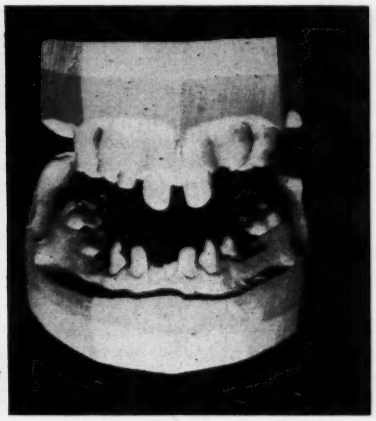
3. *When lips are spread and jaws closed, lower anteriors completely cover upper anteriors.*



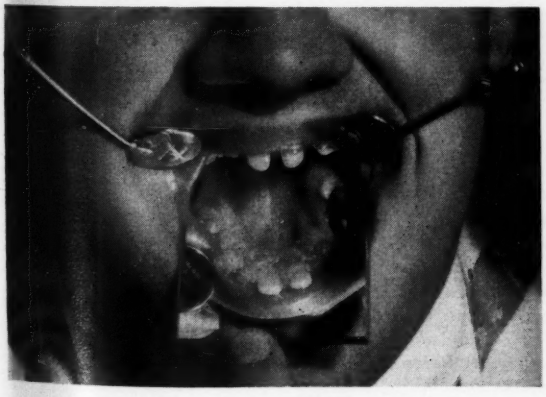
4. *Models of closed jaws indicate that the only contacting teeth are deciduous upper cuspids and lower permanent first molars. Cuspids are striking mesiolingual cusps of molars.*



5. *Models of closed jaws in profile. Note prognathic position of mandible and that the lower anteriors extend considerably above the gingival line of upper anterior teeth.*



6. *Models of jaw held open to illustrate abrasions on deciduous upper cuspids caused by rotary movement against lower first molars.*

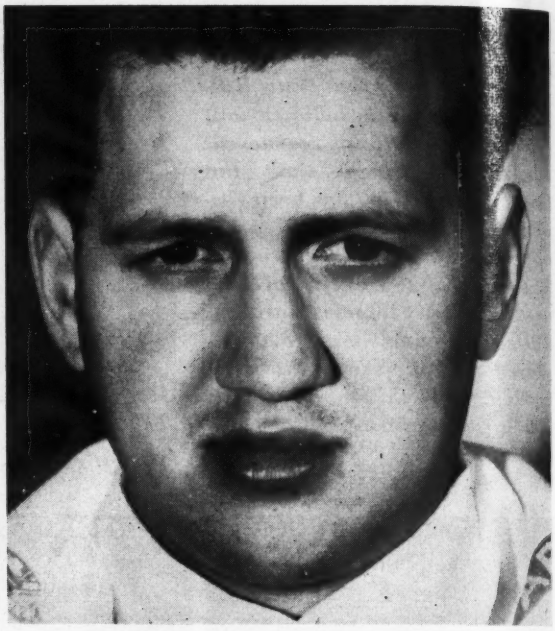


7. *Teeth present in maxilla: permanent centrals and first molars, deciduous laterals, cuspids and impacted deciduous left molar. Roentgenograms indicated that anodontia accounted for absence of other teeth. (Note small size of maxilla.)*

8. *Mandible with deciduous centrals, poorly formed but permanent laterals, cuspids, and left first bicuspid; deciduous second and third molars and permanent first molars. Roentgenograms indicated anodontia of any further tooth structure.*

(Figures 9-22 appear on pages 306-07-08-09)

9. *Absence of occlusion and narrowness of the arch and existing teeth as well as the pessimistic attitude of the patient toward rehabilitation created a difficult problem. A considerable change in vertical dimension was required to restore the mandible to a more normal relation to the maxilla.*



10. *To establish the intermaxillary relation, the vertical dimension was registered by having the patient permit the mandible to hang in a rest position, lips held tightly together. The distance from the rest position to closed position was 20 millimeters.*

11. *The second important diagnostic record was the position of the mandible in centric and a recording of the movements to determine whether there was a temperomandibular involvement. No complaints were made by the patient of any temperomandibular difficulties although the head of the condyle could be palpated in the auditory meatus.*

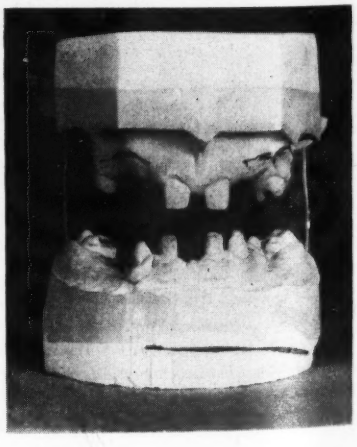
A central bearing intra-oral Gothic arch tracing was made by building baseplates on a model over the remaining teeth to make the bases tooth-bearing. A central bearing point was mounted on one base and a bearing plate on the other.

The vertical was set at 17 millimeters, 3 millimeters closed from the rest position which provided space for restoration and a more normal relation of the mandible. Fortunately, the tracing was extended to normal; the definite center indicated a favorable prognosis. The transfer was made by plaster blocks.

Fundamentals of the diagnosis indicated

(1) that full dentures could be constructed but (2) that they should be a last resort as the size of the arches and ridges and the intermaxillary relation were unfavorable; also, (3) that it was necessary to consider all factors which would aid in stability and retention.

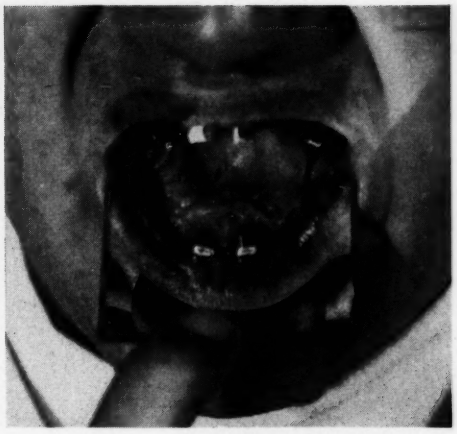
With these considerations in mind, all deciduous teeth were extracted. The upper centrals and molars and a number of lower anterior and posterior teeth remained. To restore the upper lip to normal and provide occlusion, a full upper denture was planned for the maxilla which would cover the remaining teeth. The mandible required a more normal plane for occlusion and replacement of missing teeth.



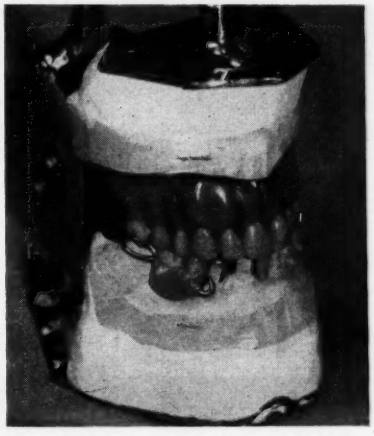
12. *To protect the upper natural teeth, a shell casting without contour was completed on the prepared teeth. A minimum of preparation was made with the gingival margin extended below the free gum margin. Individual impressions of the teeth were registered and a plaster impression was taken with wax cores over the prepared teeth. This provided a model for the indirect construction of the crowns which was necessary so the crown surfaces would be parallel for the reception of the full denture.*

13. *Anterior view illustrating the relation of the crowns—all parallel. The remaining teeth provided anterior and posterior bearing.*

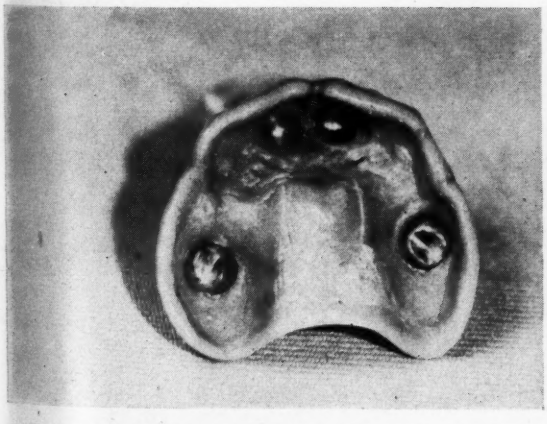
14. *Right: A full denture compound and plaster impression was taken with crowns in place. Plaster was used to obtain an accurate seating of the crowns and carry the impression to full denture. A lower hydrocolloid impression was taken for the case construction model.*

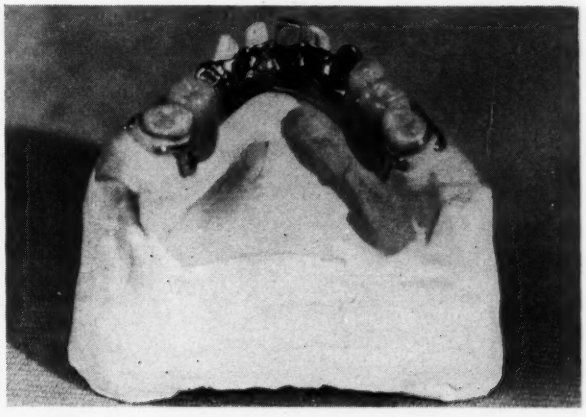


15. *Left: Baseplates and central bearing registration with Gothic arch for the final registration and complete case construction. Metal extension secured mounting jig for transfer.*



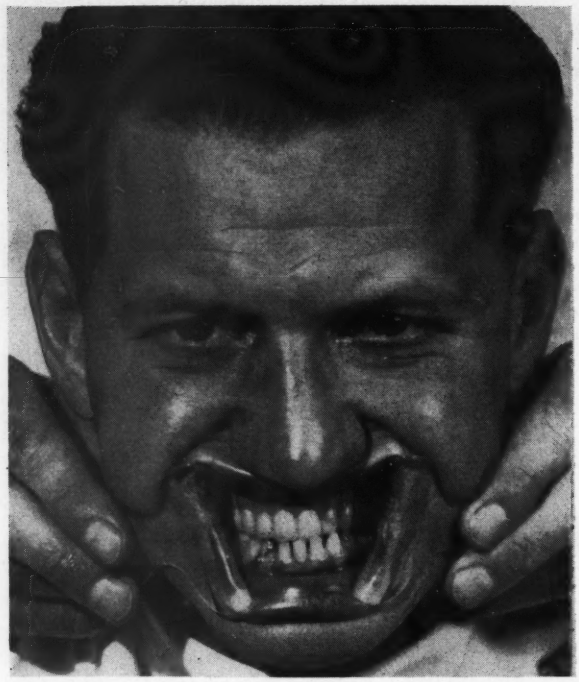
18. *Right: Full upper denture with copings, and lower removable partial denture remounted on articulator for final check prior to insertion in the mouth.*





16. *An arc piece casting of four copings joined together for reinforcement and retention was completed. The casting copings were constructed to provide an accurate equalized seating of the denture. A trial setup of teeth was made with the copings and then the denture was completed of methylmethacrylate. Undercut extension of the denture was removed to facilitate seating.*

17. *The lower occlusal plane required considerable correction to provide a more normal plane for balance. The right cuspid and molar, and left bicuspid and molar were built up to the normal plane by occlusal pads of gold on the cuspids and gold and acrylic on the molars. Fixed bridges were optional but under the circumstances of this case, a removable bridge was used. Retention was secured by T-bar clasps extending into the mesiolingual undercut of the molars and a C-bar in the distobuccal of the right cuspid.*



19. *Upper and lower cases in the mouth showing articulation.*

20. *Front view three weeks after final insertion of dentures. Note lips, relation of chin to nose, nose, eyes, and forehead.*

21. *Profile, three weeks after insertion. Note symphysis of chin in relation to maxilla and nose. The curves of the lips are normal and the lip line pleasing.*

22. *Final picture of the patient manifesting his changed disposition as a result of dental rehabilitation. No longer feeling rejected, he has developed a new outlook on life.*

PREMEDICATION

*by Co-Medication in Local Anesthesia**

S. IRVING COPEN, D.M.D., Boston

DIGEST

Last month an introductory discussion appeared on THE PROBLEM OF APPREHENSION AND ANXIETY IN DENTISTRY. The solution suggested was the submucosal administration of an analgesic-sedative (demerol hydrochloride) simultaneously with the injection of the local anesthetic (monocaine hydrochloride).

This month the method is described for combining the two medications in the syringe. Half a cubic centimeter of monocaine hydrochloride is expelled from an Anestube in an Anestube syringe. An equivalent amount of demerol hydrochloride is drawn into the Anestube from a rubber-capped vial. The filled syringe, for premedication of the patient co-incident with the administration of a local anesthetic, contains 1.75 cubic centimeters of 1.5 per cent monocaine hydrochloride and 0.5 cubic centimeter of demerol hydrochloride (25 milligrams). The combination is administered by submucosal injection.

Reports of four cases in which this method was employed have been added to the original paper reporting co-medication, of which this is an adaptation.

*This is an adaptation of a paper presented before the North Metropolitan District, Massachusetts Dental Society, December 18, 1946, and the Penobscot Valley District, Maine Dental Society, December 9, 1947, and published in the Bulletin of the Massachusetts Dental Society, April, 1947, and the American Journal of Orthodontics and Oral Surgery, April, 1947.

Demerol Hydrochloride

THE DENTAL profession needs no explanation of monocaine hydrochloride. Dentists are less familiar, however, with demerol hydrochloride (Meperidine, Demerol brand, manufactured by the Winthrop Chemical Company).

Function in Dentistry—Demerol hydrochloride possesses three main properties—analgesic, antispasmodic, and sedative actions. In dentistry, interest lies in the analgesic and the sedative actions only. The analgesic action approaches that of morphine in effectiveness; the medication is therefore indicated for the relief of pain, whatever the cause. In the preoperative preparation of the patient, it effectively relieves apprehension of the surgical ordeal. The sedative action generally overcomes restlessness.

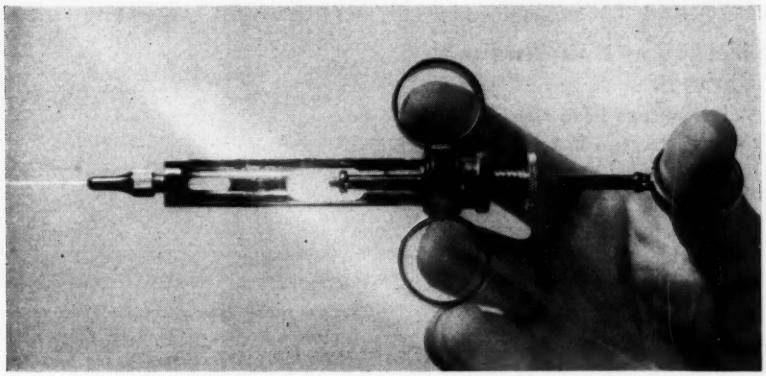
Side Effects—1. Side effects, although generally of minor importance, occur more frequently in the ambulatory than in the hospitalized patient. They are of brief duration, usually insignificant, and do not as a rule inconvenience the patient to any appreciable degree.

2. Extensive liver and kidney disease apparently does not affect a patient's tolerance of demerol hydrochloride.

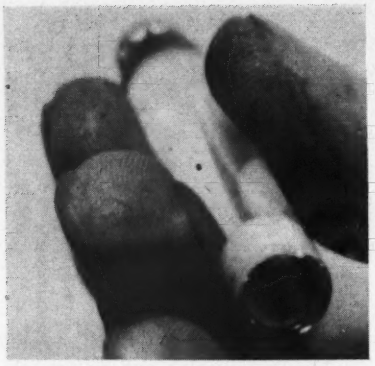
3. Nausea occurs much less frequently than it does following the administration of morphine and, in lieu of the opiates, does not produce constipation or a depression of the respiratory center. (This applies to the average adult dose of demerol hydrochloride, which is 100 milligrams [2 cubic centimeters] administered intramuscularly.)[1]

Dose—In the suggested procedure for premedication in the dental office, only doses of 12.5 milligrams, 25 milligrams, or 37.5 milligrams of demerol hydrochloride are used, these amounts being placed in a zone of complete safety with regard to all hazards of habituation. The potency depends on the case.[2]

[1]The Winthrop Chemical Company: From their literature on demerol hydrochloride.
[2]A federal narcotic license is required for the administration of demerol hydrochloride alone or in combination with an injection local anesthetic.



1. ***Anestube syringe. Observe knurled screw which firmly holds the Anestube, and threaded piston rod which screws into thread of rubber plunger.***



2. ***Anestube containing 2.25 cubic centimeters of monocaine hydrochloride. Observe thread of recessed rubber plunger.***

Monocaine hydrochloride and demerol hydrochloride are compatible.

Armamentarium

The Syringe—I use a Novocol Anestube Syringe.

The Anestube—The Anestube contains 2.25 cubic centimeters of monocaine hydrochloride solution (1.5 per cent with epinephrine 1:000,000). It has a recessed threaded rubber plunger into which the piston rod of the syringe is screwed. The Anestube is held firmly in the syringe by a knurled screw which is screwed tightly against the Anestube (Figs. 1 and 2).

Vials of Demerol Hydrochloride—The 30-cubic-centimeter vials have rubber-covered caps which facilitate the insertion of the hypodermic needle for the withdrawal of the amount of demerol hydrochloride desired. The concentration of demerol hydrochloride in the vials is 50 milligrams per cubic centimeter.

Method of Handling the Syringe

The syringe is so constructed that the body has two finger grips and the handle a third grip to engage the thumb.

1. The syringe is opened wide to permit the easy entrance of a monocaine hydrochloride Anestube (2.25 cubic centimeters).

2. The knurled screw in the upper part of the body of the syringe is screwed down firmly against the Anestube in the syringe. The piston rod is screwed into the threaded rubber plunger.

3. Approximately 0.5 cubic centimeter of monocaine hydrochloride is expelled from the syringe by pushing the handle down. This takes up a space of approximately 3/8 inch in the upper end of the Anestube. (Notches placed on the syringe facilitate the combining of these medicaments [Figs. 3 and 4].)

4. The needle of the syringe is next inserted into the sterile cap of the bottle containing the demerol hydrochloride. The piston rod is pulled back to its former position. This step draws into the monocaine hydrochloride solution about 0.5 cubic centimeter of demerol hydrochloride (approximately 25 milligrams) (Figs. 5, 6, and 7).

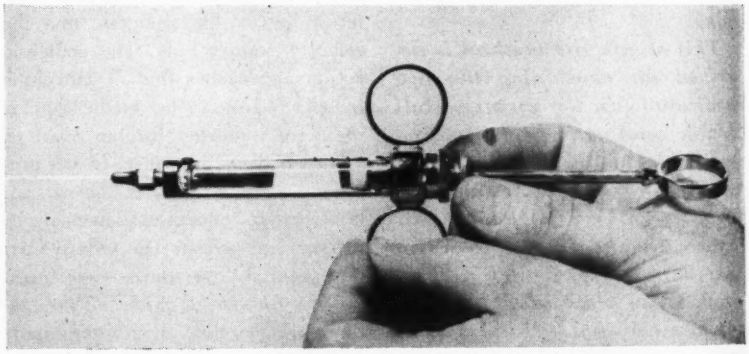
5. The full content of the one Anestube only is then injected in the usual manner; that is, that to which the dentist is accustomed for straight injection local anesthesia. If additional Anestubes are used, they should contain *monocaine hydrochloride without demerol hydrochloride.*

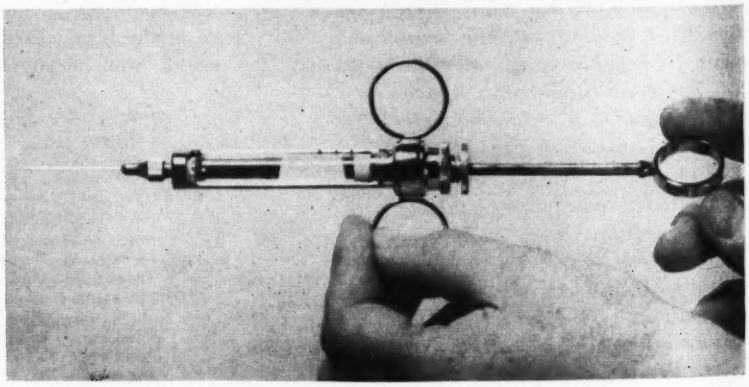
Injection Procedure and Effects

The insertion of the needle into the tissues should be done under thoroughly aseptic conditions. *The injection must be made slowly, the total time of injection being not less than one-half minute.*

A change for the better in the patient's attitude will be noticed almost immediately. The patient quickly becomes relaxed, cooperative, and free of anxiety about the impending dental procedure. This desirable state obtains within ten minutes and continues for approximately one-half to one hour. It has been my experience that the effect is terminated at the end of approximately one hour.

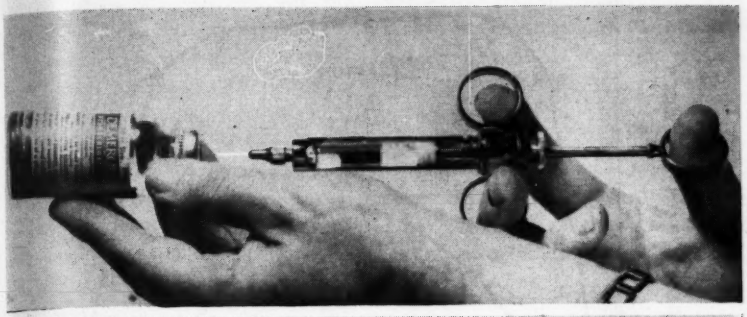
The rapidity of action of this combination of analgesics likens it to an intravenous injection. The favorable

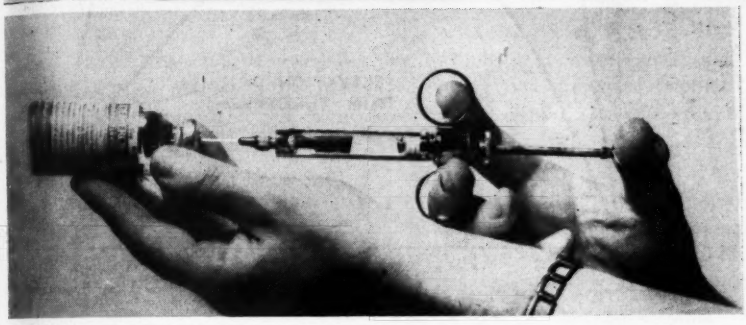




3. ***Anestube syringe containing an Anestube. Turn knurled screw to hold the Anestube firmly in syringe. Observe the three small notches on upper surface of the body of syringe. Space between each notch is 3/16 inch. Total space of approximately 3/8 inch contains approximately 0.5 cubic centimeter of monocaine hydrochloride.***

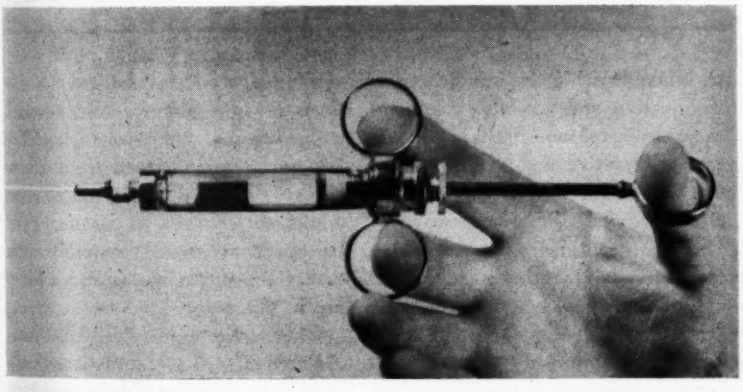
4. ***Screwing threaded piston rod into thread of rubber plunger.***





5. ***Syringe with needle inserted into bottle containing demerol hydrochloride. Observe that rubber plunger has been pushed down to furthest notch. Anestube content is thus reduced from 2.25 cubic centimeters to 1.75 cubic centimeters of monocaine hydrochloride.***

6. ***Piston rod has been completely pulled back. One-half cubic centimeter (0.5) demerol hydrochloride (25 milligrams) has been drawn into Anestube.***



7. ***Syringe with Anestube filled. It now contains 1.75 cubic centimeters of 1.5 per cent monocaine hydrochloride in combination with 0.5 cubic centimeter of demerol hydrochloride (25 milligrams).***

action is undoubtedly due to the fact that the tissues of the mouth are extremely vascular.

1. Satisfactory local anesthesia, as well as a general relaxation effect, is obtained; restlessness is allayed, anxiety diminished, and the perception of time lessened.

2. Steadiness, with virtually no lethargy, is evidenced and not the slightest sign of syncope is observed.

3. A general dryness of the mouth has been noted in all the cases treated. This is a great help in dental procedures.

4. It is interesting to observe how soon the patients completely return to a self-controlled state after the administration of monocaine hydrochloride combined with demerol hydrochloride.

This method is strongly recommended for children as well as adults. Only 12.5 milligrams of demerol hydrochloride should be used with the lower age group until enough cases have been treated to prove that larger doses can be safely employed. Only a minimum amount of demerol hydrochloride is used with monocaine hydrochloride for the purpose of local anesthesia.[3]

Experimental Application

On December 4, 1946, at the New York Hospital, New York City, Doctors J. D. Hardy and Harold G. Wolff and Miss Helen Goodell performed the following experiment and made observations which are graphically represented in Figure 8.

Procedure—The medicaments used were monocaine hydrochloride 1.5 per cent with epinephrine 1:100,000 (1.75 cubic centimeters) combined with demerol hydrochloride 25 milligrams (0.5 cubic centimeter). In the subject, H.G.W., a submucosal injection was made in the right tuberosity region and in the subject, H.G., a submucosal infiltration was made in the upper left premolar-cuspid region. J.D.H. made and recorded observations of pain-threshold determinations and psychologic changes in the two subjects.

Observations—The subjects reported a maximum state of relaxation within ten minutes after injection of the agents. This maximum relaxation continued for approximately forty-five minutes and all perceptible effects were dissipated one hour and fifteen minutes from the time of injection. The pain threshold, as observed on the skin of the forehead, was elevated 30 per cent above the control level within thirty minutes.[4]

Case Reports

Case 1: *Debility*—A woman, aged 30, had just undergone a number of serious operations, with complica-

[3]Adding air to the vial of demerol, after using some of its contents, will facilitate aspiration. Method: Sterilize the rubber cap on the vial and add air with a sterile Luer syringe by inserting the needle of the syringe into the rubber cap and forcing air into the vial. This can also be done by using a sterile empty Anestube in the Anestube syringe and operating it as one would a Luer syringe.

[4]Hardy, J. D., Wolff, H. G., and Goodell, H.: Studies on Pain, A New Method for Measuring Pain Threshold: Observations on Spatial Summation of Pain, J. Clin. Investigation **19**:649-657 (July) 1940.

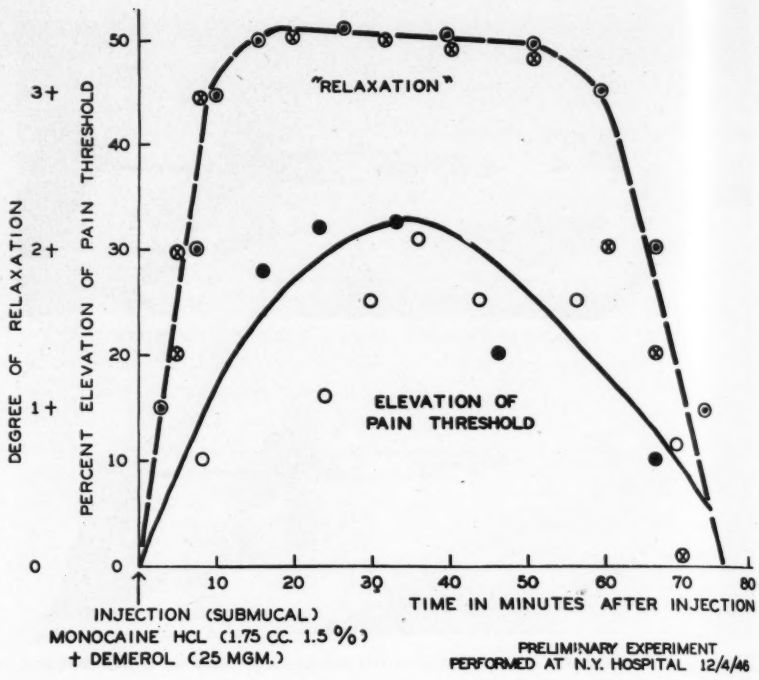
tions (a general septicemia), which kept her hospitalized for a long period. When she was able to leave the hospital, she was in no position to have much of anything else done, although immediate dental care was needed. In the office, she looked worn out, perspired constantly, and was so weak that she found it difficult to stand for even a few minutes at a time. She talked continually about what she had been through and was afraid of anything that meant more treatment.

She was seen five times and on each visit received co-medication, 25 milligrams of demerol hydrochloride being added to the monocaine hydrochloride. Relaxation quickly followed, her anxieties were temporarily allayed, and the dental treatment was carried out most satisfactorily.

Preoperative sedation was needed to help the patient through the dental procedure. Only 25 milligrams of demerol hydrochloride were required during each visit to accomplish this purpose. Co-medication was a blessing in this case.

Case 2: *"Root Anxiety"*—A woman, aged 43, was much disturbed and emotionally unstrung during an emergency appointment. She begged to be sent to a hospital immediately to have a root removed under ether, explaining that she had had two teeth extracted under gas anesthesia three days previously. One tooth had broken and the root remained. The dentist tried to remove it under local anesthesia that morning but had to give up the attempt because the anesthesia was not effective. He then told her that he would have to send her to a hospital to have the root removed under ether. Because of the uncertainty of getting her into a hospital that day, the patient saw her physician, who in turn sent her to me. Again she pleaded that I get her into a hospital, declaring that she could not endure knowing that the root still remained.

I finally quieted her enough to x-ray the area. After some coaxing, she permitted me to inject a combination of monocaine hydrochloride and demerol hydrochloride (37.5 milligrams). I continued to assure her that the anesthesia would be effective.



8. ***Preliminary experiment performed at New York Hospital on December 4, 1946. A study of monocaine hydrochloride (1.75 cubic centimeters—1.5 per cent) in combination with demerol hydrochloride (0.5 cubic centimeter—25 milligrams) illustrating degree of relaxation and effect on pain threshold. Injection, submucosal.***

She relaxed within ten minutes after the injection and was also aware of the presence of anesthesia. She became cooperative and expressed the hope that it was now unnecessary to go to a hospital.

In the meantime, I removed the root routinely, told her that it was "out," and assured her that she need have no more anxiety about it. When I saw her the following day for postoperative treatment, I was amazed to find her free of anxiety and perfectly happy.

What happened to the previous dentist has happened to me in the past. This patient evidently developed a "root anxiety" along with an uncertainty of the anesthetic experience, firmly believing that any form of anesthesia other than ether would not be successful. Actually, I believe that the injection local anesthetic administered that morning was effective, although there are times when good local anesthesia can be offset by a patient's fear. What this woman needed was preoperative sedation (in any form), which she received through co-medication, unknown to her. *The relaxing effect obtained freed her of anxiety; her uncertainty about local anesthesia changed to certainty*, and treatment proceeded smoothly after that. Co-medication was also a blessing in this case.

Case 3: *Fearful Child*—An 8-year-old boy came into the office with his mother to have a tooth removed on the advice of his orthodontist. He cried and refused to submit to the extraction because he remembered how intensely a previous extraction had hurt him. He was uncooperative and gave every possible reason why he thought the tooth should not be removed.

After assuring him that the extraction would be different this time, I succeeded in injecting a combination of monocaine hydrochloride with demerol hydrochloride (12.5 milligrams). Within ten minutes the patient became completely relaxed, his

whole personality changed for the better, and I extracted the tooth.

It is apparent that the poor behavior of this patient was due to his remembrance of the pain of a previous extraction; hence his marked anxiety over a repetition of the experience. It required only 12.5 milligrams of demerol hydrochloride to bring about sufficient relaxation to clear up the anxiety state he was in. Co-medication was certainly a help to this 8-year-old boy.

Case 4: *Syncope Syndrome*—A young man, aged 25, had a number of extensively carious teeth which required restorations. I started treatment by using only monocaine hydrochloride, but the patient lost consciousness almost immediately, which greatly interfered with the work. On his next visit I again used only monocaine hydrochloride, with the same result. On the third visit I used a combination of monocaine hydrochloride with demerol hydrochloride (25 milligrams). Although I expected a repetition of the previous events, there was no evidence of syncope and everything ran smoothly. On the fourth visit I again used only monocaine hydrochloride, and again the patient fainted.

I was now certain that injection local anesthesia alone was reponsible, and on questioning, he told me that he had a similar experience every time he was given a local anesthetic. On his fifth visit I again used a combination of monocaine hydrochloride and demerol hydrochloride (25 milligrams), and to my great surprise there was again no evidence of syncope.

In summarizing the results in this case and several similar ones, I have concluded that in some patients there is a correlation between injection local anesthesia and syncope. *If syncope is due to a non-evident anxiety, preoperative sedation through co-medication may be found to overbalance the disturbing syncope syndrome.* Co-medication was the solution to this situation.

Operations Performed

Between September 24, 1946, and November 1, 1947, I treated 183 apprehensive and anxious patients with this method of co-medication. The number of patients requiring various operations follows:

Ninety-three, extensive cavity preparations (single and multiple); 36, extractions (single and multiple); 2, surgical removal of hidden roots (single); 14, surgical removal of impacted teeth (single and multiple); 4, pulp extirpation; 2, an extensive alveolectomy; 3, an extensive alveolectomy with extraction of the involved teeth (multiple); 1, an extensive alveolectomy including a radical cystectomy (multiple) with extraction of the involved teeth (multiple); 1, a radical cystectomy; 11, a radical cystectomy with extraction of the involved teeth (multiple); 2, a radical cystectomy including an apicoectomy of the involved tooth; 1, a radical gingivectomy; 1, a flap resection; 5, three-quarter crown preparations; 4, jacket crown preparations; 2, a pulpotomy; 1, opening into an abscess to establish drainage.

The injections were *submucosal*: infiltration 76, mandibular 58, and tuberosity 49.

Doses—Eight patients (children) received 12.5 milligrams of demerol hydrochloride; 167 patients (adults) received 25 milligrams of demerol hydrochloride; 8 patients (adults) received 37.5 milligrams of demerol hydrochloride.

General Observations—The youngest patient was 8 years of age and the oldest was 62.

I am happy to report that in no instance have I found that even a single dependency has resulted because of the addition of demerol hydrochloride to the monocaine hydrochloride. About 25 per cent of the patients were told at the time of treatment that something had been added to the injection local anesthetic. This information did not alter their reactions. They were more grateful because thought had been given to their comfort. In all instances, the combination was technically satisfactory.

I should say that in patients whose anxiety was moderate, less sedation was needed than in those with severe anxiety. (This arbitrary division of cases is based on an overall evaluation of the clinical aspects.) The moderate cases predominated in the series.

My experience indicates that, once the anxiety syndrome is resolved, co-medication can be discontinued. All further work can be carried out with injection local anesthesia only. The dramatic effect of co-medication has convinced me and my associates that it promises a control of the anxiety syndrome in the dental office with extremely simple procedures.

Comments

The degree of anxiety may be so great that the first injection cannot be made until after several visits during which the dentist exercises extreme patience.

The relief of pain and the prevention or removal of apprehension and anxiety are the cornerstones of the dental profession. Better methods for helping people are now known. A psychiatrist should be consulted whenever the dentist needs such counsel. A knowledge of medical psychiatry can be extremely helpful. I think that through this understanding we shall make many friends among our patients, for that has been my experience.

With a better insight into patients who have built up a definite objection to dentistry, the newer methods for handling them will encourage them to come willingly, and a better psychologic adjustment of the dental situation will have been obtained. Any indifference on our part will retard us from obtaining this understanding. Premedication is an instrument and channel to dental mental relief.

There must be a closer association between the dentist, the physician, and the psychiatrist. As a dentist, I should not infringe on the province of the psychiatrist; but a long illness has taught me the need of this phase of medicine, and that is why I favor it. The insight I have obtained is very helpful to me.

Summary and Conclusions

1. Through co-medication with a combination of monocaine hydrochloride and demerol hydrochloride, satisfactory local anesthesia as well

as a general relaxing effect is obtained.

2. These combined medicaments allay patients' apprehensions and anxieties, leaving them in a state of calmness and a receptive mood for the treatment that follows.

3. A patient need not be aware that he has received a hypodermic injection if the dentist chooses not to tell him. This is an important feature of co-medication. In any other method, the patient is aware of premedication and is usually also aware of the *type*.

4. Experience has shown that an escort is not essential.

5. Co-medication can be used with safety in the dental office.

29 *Commonwealth Avenue.*

Subacute Bacterial Endocarditis and the Dentist

OGLESBY PAUL, M.D., Boston

Clinical Features

Age of Patient—In a series of forty-four consecutive patients with subacute bacterial endocarditis (studied at the Massachusetts General Hospital in the years 1944 to 1946), there were twenty cases under the age of 30.

Types of Cardiac Damage—The types of damaged hearts most susceptible to the infection in this series were the rheumatic hearts (82 per cent of the group) and the congenital cardiacs (14 per cent of the total).

Effect of Extractions—In five of the forty-four cases, dental extractions (without prophylactic chemotherapy) appeared clearly to have been the precipitating event, and there were other cases in which the evidence was suggestive but not conclusive.

Streptococci Infection—Over 90 per cent of the whole group were found to be infected with streptococci (mainly nonhemolytic and alphahemolytic strains).

Symptoms—These patients complained of feverishness, weight loss, chills and sweats, loss of appetite, and all showed elevated temperatures and evidences of heart disease; many were acutely ill when admitted to the hospital.

Penicillin Therapy

All of the forty-four cases in the series were treated with penicillin, given in large doses over a long period of time. This treatment, while a superb improvement over other older methods of therapy, is time-consuming, expensive, uncomfortable for the patient, and not always curative. Some idea of the complexity of the problem may be gained from the fact that those patients who survived spent well over one month in the hospital, received on the average 600,000 units penicillin daily for at least three weeks, and were either incapacitated from work for a period of months, in the most favorable cases, or were rendered permanent invalids as a result.

It was necessary to give some patients as many as 15,000,000 units penicillin a day. Such a dose obviously makes the cost of curing a single case mount into several thousand dollars. One does not begrudge such an expense, but, unfortunately, even this lavish use of the drug is no guarantee of cure; and one-third of our patients are now dead. Despite the advances in our knowledge of the disease and in its treatment, we are still falling far short of an ideal therapeutic schedule.

Preventive Measures

The dental profession has long been aware of its role in the prevention of subacute bacterial endocarditis—unusual care in performing extractions when individuals are known to have either rheumatic or congenital heart disease. The avoidance of undue trauma at the time of extraction may help to prevent sudden flooding of the blood stream with a large number of bacteria.

Sulfonamides—Patients with rheumatic or congenital heart disease should always receive prophylactic chemotherapy prior to any dental extraction. The disadvantages of sulfonamide ingestion are: previous sensitization to these drugs; subsequent sensitization; and the occasional breaking through this barrier by infection.

Penicillin—It seems logical to employ prophylactically the same chemotherapeutic agent that is used therapeutically; namely, penicillin. One of two plans may be followed:

1. The easiest approach for the dentist is to have the patient see his physician two hours prior to the extraction and receive a single injection of 300,000 units penicillin in oil and wax intramuscularly. Such a dose will protect over the course of probably at least six hours (when the danger is greatest) and possibly for as long as twenty-four hours. Its administration avoids the necessity for hospitalization.

2. An alternate plan is to administer 100,000 units ordinary penicillin intramuscularly just prior to extraction and 50,000 units every three hours during the next twenty-four hours. This method will obviously necessitate either hospitalization or the attendance of a nurse at home and is therefore less practical.

The use of oral penicillin is not recommended at this time because of the variability of the drug levels obtained in the blood.

Good Oral Hygiene—The most efficient prophylaxis is the maintenance of good oral hygiene and good dental repair so that the need for frequent extractions in individuals with rheumatic or congenital heart disease is kept at a minimum. It is the duty of the physician to give to the dentist his full cooperation in this field.

—From *American Journal of Orthodontics and Oral Surgery* 33:376-377 (May) 1947.

The EDITOR'S Page

MOST DENTAL clinicians consider the enamel as being an inorganic structure virtually devoid of life processes. This concept of biologic inertness has led us into grievous errors in the consideration of the etiology of dental caries and the treatment of that condition. Our classical attitude toward caries has been that it is primarily a dissolution of enamel by acids with a secondary invasion by bacteria.

In our treatment attitude we have thought in terms of mechanical intervention in avital structures. In fact, the average clinician fails to think of the *dentine* as being an organic tissue that is supplied by fluids from the general circulatory system and that it is in direct contact with the central nervous system.

Manley,[1] a British anatomist and histologist of the University of Birmingham, has recently written a provocative report, documented with beautiful photomicrographs, that describes five enamel structures that must be considered composed of organic material: (1) The enamel cuticle (Nasmyth's membrane); (2) the prism sheaths; (3) the enamel lamellae; (4) the enamel tufts; (5) the enamel spindles.

Without exception, histologists and clinicians are agreed that the embryonic membrane enveloping the tooth is an organic structure. Manley has shown in decalcified sections of developing enamel that the enamel prism sheaths stained deeply with hematozylin and eosin whereas the prisms and interprismatic substances, which are inorganic, do not accept the stain.

The lamellae "may be considered as normal parts of well developed enamel. They are organic bundles or strands which cross the enamel at right angles to its surface. They may extend from the amelo-dentinal junction to the surface of the enamel." Gottlieb and Fish have both demonstrated that "the lamellae are continuous with Nasmyth's membrane and also with the prism sheaths of the enamel."

Enamel tufts arise from the amelo-dentinal junction and extend into the enamel about one-third of the thickness of the structure. "They have been described as representing enamel prisms and interprismatic substance less calcified than the surrounding enamel."

Enamel spindles, although dentinal in origin, must be considered to be part of the organic nature of enamel. "They may be described as small club-shaped extensions of dentine substance included in the enamel and they are found chiefly over the dentine cusps."

Although enamel is predominately calcified inorganic tissue, the presence of organic elements in the structure is of important clinical meaning. Organic structures respond to stimuli and invaders in a different fashion from the response recorded in inorganic structures. The entire subject of caries prevention and control and the principles of operative dentistry may require revision in the light of the newer role of the organic structure of enamel.

Manley is not unmindful of the important clinical implications of his histologic studies when he writes: "The new conception of Gottlieb concerning the cause of dental caries has thrown some doubt on the long-accepted views of Miller that the initial attack of caries on enamel consists of a dissolution of inorganic interprismatic substance by acid produced on the enamel surface. Gottlieb, as a result of his recent investigations, is of the opinion that caries commences with the invasion by micro-organisms along the organic path of a tooth. He states that it begins as proteolysis of organic structures and that acid is only involved secondarily in the process. Gottlieb, Diamond, and Applebaum have submitted evidence in support of their conclusion that the bacteria associated with the etiology of dental caries have an affinity for organic matter rather than for inorganic tissues and must therefore be regarded as proteolytic rather than acidogenic.

"In the light of this conception, the organic elements in enamel have assumed a greater significance. The prism sheaths and lamellae may be attacked from the surface, the lamellae forming a direct and easy path for the invasion of proteolytic micro-organisms to the dentine and the 'tufts' would assist the spread of the disease from within along the amelo-dentinal junction."

[1] Manley, E. B.: The Organic Structure of Enamel, Brit. D.J. 84: 183:189 (May) 1948.

The Planning of INCISIONS

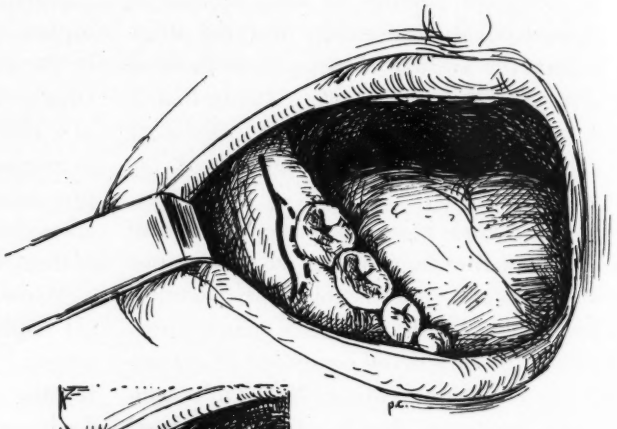
WILLIAM I. OGUS, D.D.S., Washington, D. C.

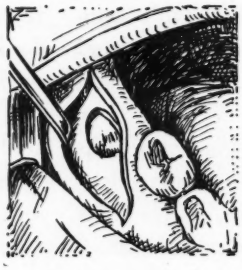
DIGEST

Faulty incisions in dental surgery are a cause of pocket formation and pain involving sound teeth not intended for removal from the surgical area. Specifically, what happens is that the retraction of gingival tissue following incision exposes the cementum by destruction of the periodontal fibers. The concensus is that detached periodontal tissue constitutes permanent and irreparable damage.

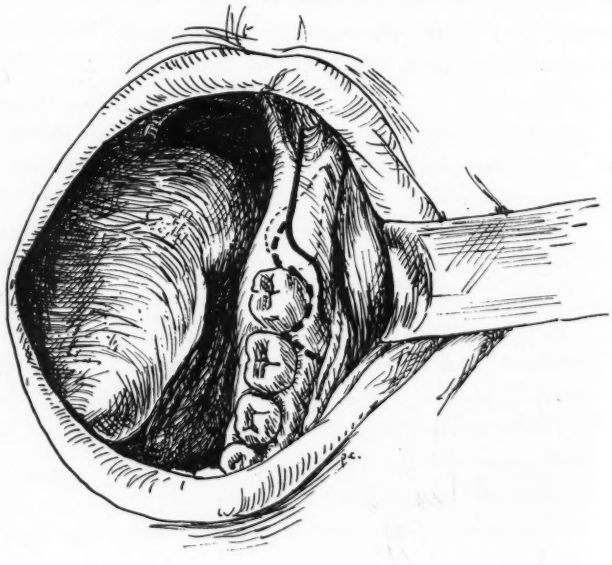
To guard against pain and tissue detachment, the incision line should be made a short distance from the gingival crest. The border of tissue thus provided for the protection of the tooth to be retained has been termed a "gingival collar." The width of it varies according to whether suturing is necessary and according to the location of the tooth.

For the protection of sound teeth involved in specific surgical procedures; namely, the removal of impactions and cysts and radical surgery of the maxillary sinus, preventive steps are noted and illustrated for each operative plan.

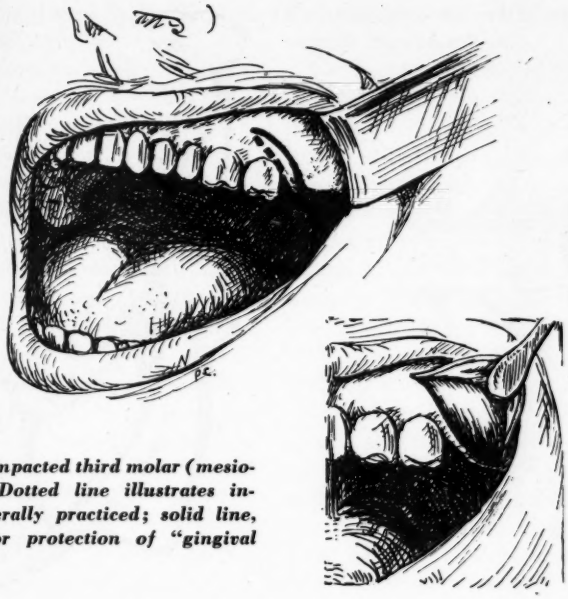




1. *and* **2.** *Left and right sides of mandible with outlines for removal of impacted third molar in horizontal position. Wrong: Dotted line represents incision commonly practiced. Right: Solid line, incision with conservative approach to protect "gingival collar."*



IN THE literature on operative procedures in oral surgery, no definite pattern seems to be followed in making incisions. Authors often illustrate different types of incisions for like conditions. In edentulous cases, this



3. ***Upper impacted third molar (mesio-angular). Dotted line illustrates incision generally practiced; solid line, incision for protection of "gingival collar."***

is not important; but when one or more teeth in the line of surgery are to be retained, the "gingival collar" should not be disturbed or destroyed. Incisions which strip the gingival tissue from sound teeth cause damage resulting in a number of complications.

The study of over one hundred cases indicates that dental structures have been damaged by heedless incisions and retractions. As a result, patients complain of pain, general discomfort, sensitive teeth, and deep pocket formation. The cause of these

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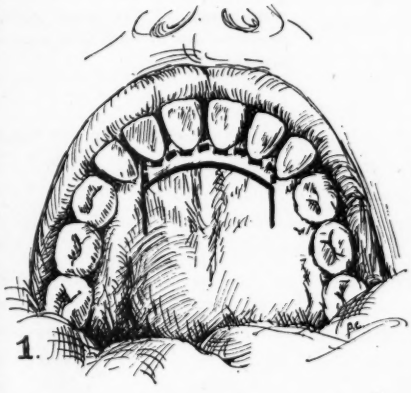
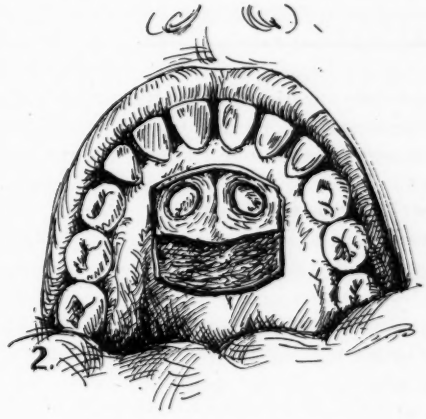
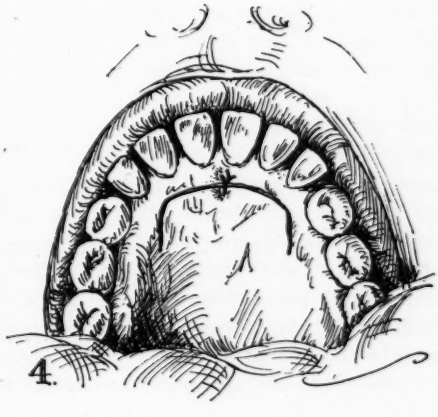
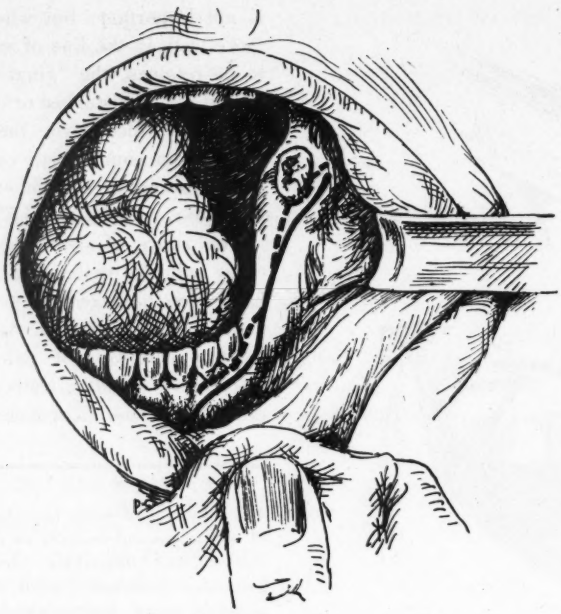
4. Incision and retraction for removal of two impacted cuspids in the palate. Dotted line illustrates incision line generally followed; solid line illustrates a more conservative approach with full protection to the "gingival collar" of each tooth to be retained.









5. ***Incision for extensive cyst excision with teeth to be retained in operative field. Dotted line: Incision generally practiced; solid black line demonstrates a more conservative approach which protects "collar" of each tooth to be retained.***

6. ***Incision for extensive cyst removal. Dotted line illustrates incision generally practiced; solid black line illustrates protection of "gingival collar" and preservation of sufficient tissue for suturing.***

conditions can nearly always be traced to traumatic retraction of healthy tissue from a sound tooth.

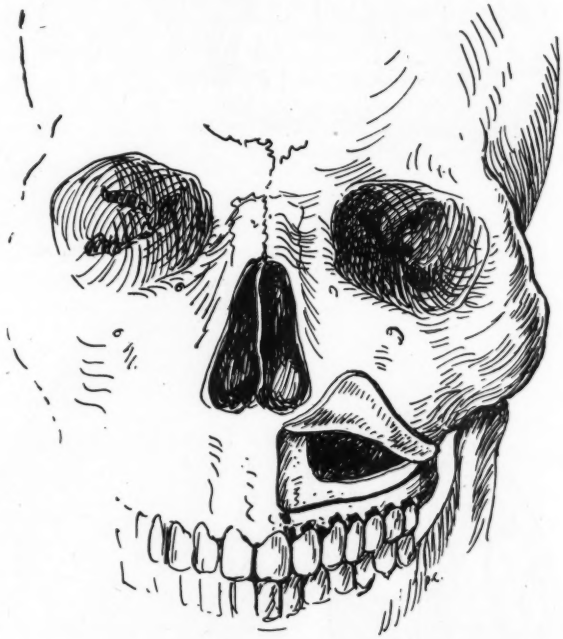
Protecting Sound Teeth in Surgical Area

Retraction follows incision in all operative cases. The author is particularly interested in citing those cases in which teeth adjacent to the surgical area are to be retained; namely, as in:

1. Surgical removal of teeth.
2. Surgical removal of impactions.
3. Removal of cysts and tumors.

Sound teeth should be protected through the preservation of the "gingival collar" and sufficient tissue for suturing (when suturing is indicated).

Removal of Impactions—1. Horizontal or mesioangular third molar. On exposure, the crown is often found to be closely abutted to the second molar. The resulting pressure may have caused some resorption of this second molar. The incision can be made in such a way as to protect the "gingival collar," (Figs. 1 and 2) and the removal of the impaction



7. ***Exposure for radical maxillary sinus operation. Dotted line illustrates incision most commonly made; solid line, protection of "gingival collars" and provision for suturing.***

can be accomplished by the surgical splitting technique.

2. Mesioangular upper impaction. Curve the incision to protect the "gingival collar" of the second molar. It is immaterial how far the incision is carried anteriorly so long as the collar is protected (Fig. 3).

3. Impacted maxillary cuspids. The incision should be made one-quarter of an inch or more above the central and lateral incisors on the palate (Fig. 4). If an impaction is in close proximity to the anterior teeth, surgical exposure, then splitting of the teeth, is recommended to protect the "gingival collars" of teeth adjoining the operative area.

Excision of Cysts—For extensive cyst excision (Fig. 5) again plan the incision to protect the "gingival collars" of all teeth to be retained in the surgical field. When the incision has to be carried beyond the anterior teeth, curve it from one-fourth to one-half inch below the neck of the teeth. This technique enlarges the space exposed rather than diminishes it.

In removing a multilocular cyst (Fig. 6), protect the "gingival collars" of all teeth to be retained in the line of incision. Curve the incision to protect the "gingival collar" of the last tooth in the surgical field.

Radical Surgery on Maxillary Sinus—Make the incision from one-third to one-half of a root length above the "gingival collar." In this operation the roots of teeth may be involved at the apex (Fig. 7). Other parts of the teeth are seldom involved.

Consequences of Traumatic Retraction

Pocket Formation—Pockets result from the detachment of the periodontal fibers from the cementum by retraction of tissue. In many instances these pockets become infected and remain an ideal culture medium for the growth of mixed organisms. In the patient with lowered resistance, the pockets cause the spread of Vincent's infection. Other types of organisms lead to other infections. Periodontitis may begin at this point.

Gottlieb and Kronfeld are of the opinion that it is impossible to bring about reattachment of the soft tissue walls of periodontal pockets; and this is the opinion of most histologists. Claims of reattachment have been made, but they have not been accepted. Destruction of the periodontal fibers and exposure of the cementum must therefore be regarded as permanent and irreparable damage.

Pain—Pain resulting from the retraction of tissue around a sound tooth in the surgical area (or adjacent to a tooth that has been removed) is usually caused by exposure of the cementum. But there are many cases in which cementum shows signs of injury caused by the elevation against it of a tooth adjacent to a tooth or teeth being removed.

Treatment consists of (1) the application of a desensitizing agent; (2) devitalization, or (3), as a last resort, extraction of the tooth. In one case of trifacial neuralgic involvement, pain continued after extraction. A procaine-alcohol injection had to be administered to relieve the patient of pain.

Discomfort—Sometimes a tooth is not sensitive to percussion, but the patient feels discomfort and constantly complains of it. The tooth may be found to be in slight traumatic occlusion from pressure applied against it during operation. This pressure forces the tooth anteriorly and slightly elevates the distal cusp. Or, the tooth drifts distally, following extraction of the tooth distal to it, and the mesial cusp is elevated.

Treatment consists of grinding the cusp involved and relieving the tooth from trauma. Rest and relief from trauma may lead to recovery.

The proper use of the electric knife for some incisions may be beneficial, especially in the presence of pericoronitis in the region of an impacted third molar. This method controls infection and arrests hemorrhage, as the electric knife cuts, coagulates, and sterilizes at the same time.[1]

It is recommended that the incision be made only to the periosteum and not to the osseous structure. The osseous structure should not be overheated, as this may cause an osteomyelitis followed by sequestration. I do not recommend the substitution of an electric knife for a scalpel in all incisions but suggest its use where surgical judgment requires its use for greater safety in the control of infection.

1832 *Eye Street, N. W.*

[1]Ogus, W. I.: Electrosurgery in Dentistry, DENTAL DIGEST 48:411-417 (September) 1942.

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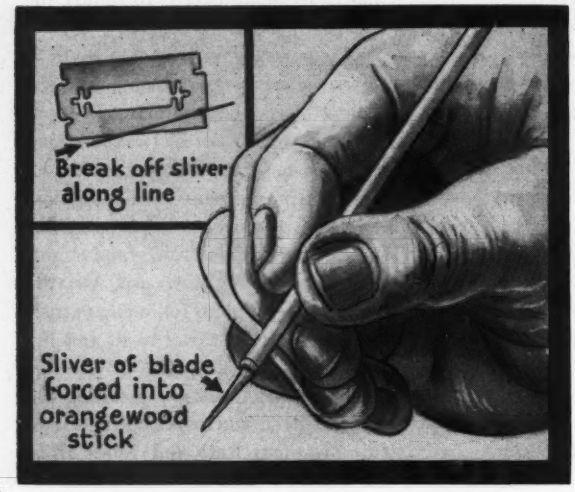


1

Sharp Knife for Laboratory Use

R. C. Bentzen, D.D.S., Sheridan, Wyoming

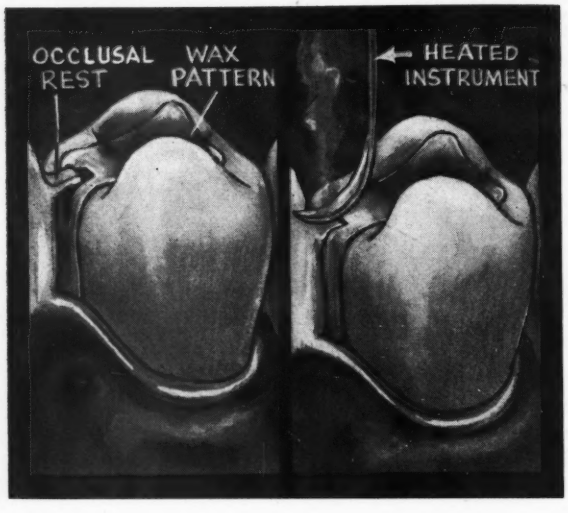
1. Using a pair of pliers, break a small piece from the cutting edge of a safety razor blade. Force this piece of blade into an orangewood stick. This delicate knife is particularly useful for trimming wax patterns.

2

Forming the Occlusal Surface of a Pontic

J. G. Adams, D.D.S., Point Pleasant, New York

2. Select a denture tooth of proper size and anatomic form. Lubricate the tooth and press into a piece of softened modeling compound. Chill the compound and remove the tooth. Inlay wax is flowed into the lubricated compound impression, chilled, removed, and the wax pontic is adjusted on the articulator. This procedure eliminates free-carving of the occlusal surface of the pontic and ensures an anatomic reproduction.



3

Restoring a Clasped Tooth with a Gold Inlay

J. Meade Bowman, D.D.S., Knoxville, Tennessee

3. When it is necessary to restore a tooth that carries a clasp with an occlusal rest, it is often difficult to secure a proper relationship between the rest and the depression in the casting. To overcome this difficulty, this procedure is helpful: Before removing the wax pattern from the tooth, lubricate the rest, place the bridge in the mouth but do not force to place. Heat an instrument and press the instrument gently on the tip of the rest and force the clasp to place. The heated rest will sink into the wax pattern. The pattern will not be distorted and a proper fit in the depression is assured.

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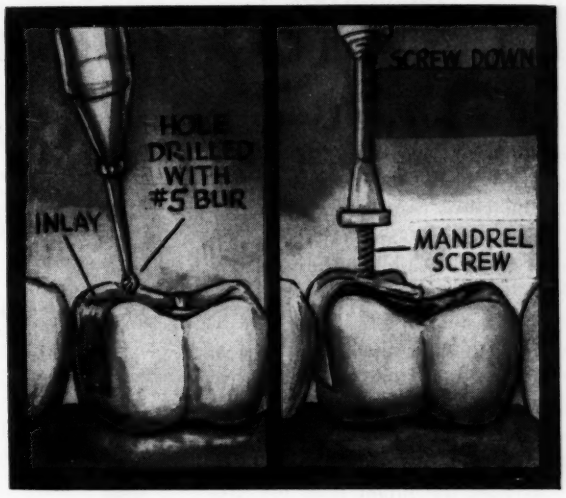
GGESTIONS . . .

Removal of a Cemented Gold Inlay

Edward J. Jackson, D.M.D., Brooklyn

4. Drill a hole in the occlusal surface with a number 5 bur until the bur strikes the cement. Insert a mandrel screw in the hole and, using a small screw driver, turn the screw until the inlay is loosened. If the inlay is to be re-cemented, the hole may be closed with solder or gold foil may be used after cementation.

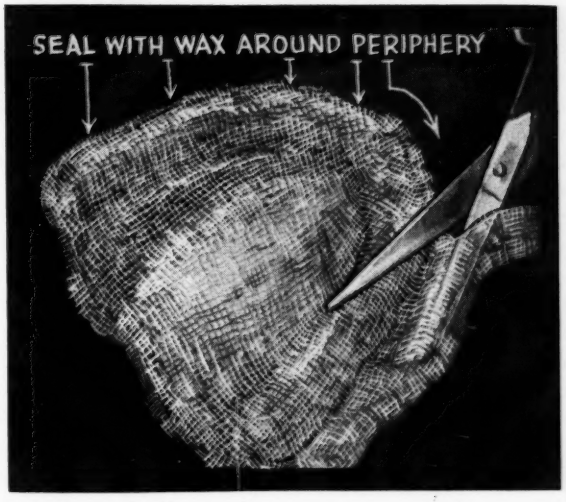


4

A Full Denture Impression Using an Alginate Wash

J. M. Robinson, B.D.S., Stratford, New Zealand

5. An impression is taken in modeling compound, trimmed, and scraped as for a plaster wash technique. A single thickness of cotton gauze is adapted to the modeling compound tray, sealed at the periphery, and trimmed to shape. It will be found that the alginate or colloid impression material will adhere firmly to such a tray.



5

Removing Third Molar Tissue Flaps

Captain Milton R. Ellis, Bangor, Maine

6. For excising the soft tissue flaps over lower third molars, the following procedure is effective: One beak of a five-inch hemostatic forceps is inserted under the flap as far as the distal marginal ridge of the tooth. The beaks are then brought together and clamped. This will give a firm hold on the tissue to be removed. A sickle-shaped scalpel is used to trim and free the tissue that is held in the forceps.

6

suitable illustrations; write a brief description of the technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 328 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

MEDICINE and the Biologic Sciences

Immunization of Mothers

It is recognized that the human placenta readily transmits diffusible substances such as antitoxins and antibodies. The lack of immunity in the mother is reflected in the baby.

Today about 50 per cent of women, as a result of childhood prophylaxis, have some immunity to diphtheria in contrast to about 15 per cent as seen in the preimmunization era of the past generation. About 80 per cent of women and about 85 per cent of babies are not immune to whooping cough.

Because the infant does not produce a proper titer of antibodies by active immunization, it should be protected during the first few months of life by passive immunization. Passive immunity for this period can be conferred against diphtheria, whooping cough, and probably other diseases for which there are effective vaccines by active immunization of the mother in the last trimester of pregnancy.

Vaccine and toxoid therapy during pregnancy may serve to suppress formation of anti-Rh antibodies. This method of counterimmunization offers an additional reason for active immunization in pregnancy. Inoculations for this purpose should be given from the first trimester through the last.

Active maternal immunization has no observable deleterious effects on the offspring but the mother often has local discomfort for a brief period. At times, fever and systemic reactions develop which, however, have no ill effects on the pregnancy.

A recommended program is now available. An intradermal test with a 1:10 dilution of diphtheria toxoid is first performed on all Shick positive patients. If the reaction is definitely positive within 30 minutes, either diphtheria toxoid is omitted (in case the reaction is very marked) and plain pertussis vaccine is given; or, the initial dose of 0.1 cubic centimeter diphtheria toxoid is followed by 0.25, 0.5, and 1 cubic centimeter added to the pertussis vaccine in the same syringe.

Some men favor the use of a fluid diphtheria toxoid combined with a pertussis vaccine containing 15 billion pertussis bacilli per cubic centimeter, beginning with 1 cubic centimeter followed by 2 cubic centimeters for two doses and then 3 cubic centimeters totaling 120 billion pertussis bacilli. In sensitive patients the diphtheria toxoid in increased dosage is added to pertussis vaccine as described. This method causes fewer and less severe reactions than alum preparations which, in addition, often leave annoying nodules. When the infant is 6 months old, appropriate active immunization should be carried out.

Cohen, Philip, and Scadron, S. J.: Effects of Active Immunization of Mother on Offspring, J. Pediat. 29: 609-619 (*November*) 1946.

Tobacco Angina

Reams have been written both for and against the use of tobacco. And judging from the continued disparity of opinion reflected in the printed material, it seems as though the controversy will go on for a long time.

There are many reasons for the disparity of opinion relative to the use of tobacco. One is the fact that tobacco, like alcohol, varies so widely in its effects on different individuals. And, too, it appears that judgment is based to a great extent on what one cares to believe. Those who enjoy smoking when it does not produce any recognizable deleterious effects on them, as a rule believe that indulgence in the habit is harmless. On the other hand, many who have never smoked have no trouble in finding many logical facts to support their opposition.

Nevertheless, with the apparent increase in cardiac disease and the widespread use of tobacco as an escape from the increasing worldwide tension, there is ample evidence to justify the suspicion that tobacco is at least a contributing factor. Both chemical and, occasionally, electrocardiographic evidence sustain the belief that cases of cardiac dysfunction may be caused by the excessive use of tobacco. Similar conditions occur in those who do not tolerate tobacco well.

Such dysfunction may sometimes be indistinguishable from a true angina pectoris, but when it cannot be proved it may be called pseudo-angina, anginoid cardiac pain, and angina minor. It is true that the use of coffee, alcohol, benzedrine, and tobacco to stimulate the physical and mental capacity to attain the pace necessary in modern accelerated living may cause the same symptoms.

Those who maintain such velocity may expect to have cardiac pain, palpitation, tachycardia, extrasystoles, left arm pain, and even a feeling of impending death when these habits become addictions. So the ill effects of tobacco cannot be entirely disregarded.

British observers advise caution in assuming that tobacco plays a major role in angina pectoris. In the Lancet we find this statement: ". . . unless and until such an investigation shows that smoking alone can produce an-

gina pectoris, clinicians will be justified in contending that, per se, it is not an important factor in the genesis of this condition." Such a contention on the part of the British is understandable because no other group is more particular about their pipes or more expert in making them. They have always been connoisseurs in concocting tobacco mixtures. It is logical for them to demand convincing evidence concerning deleterious effects of tobacco.

Editorial: *Internat. M. Digest* 52: 121-122 (*February*) 1948. *Annotation*: *Tobacco Angina, Lancet* 2:766 (*November* 22) 1947.

Bronchology

Twenty-five years ago bronchoscopy was associated only with the removal of foreign bodies which had become wedged in the air passages. These incidents were comparatively rare. Today, bronchology is regarded as a specialty of medicine and virtually every large hospital has a well-organized bronchoscopic clinic.

Bronchoscopy is employed as an aid in either diagnosis or in treatment of almost all bronchopulmonary diseases associated with bronchial obstruction or with an increase of bronchial secretions. In certain fields of medicine and surgery, its importance is on a par with that of roentgenology. Less than 2 per cent of all bronchoscopic procedures today are undertaken for the removal of foreign bodies from the air passages. The occurrence of foreign body accidents has not decreased but the number of cases is outnumbered by the large group of bronchopulmonary diseases requiring bronchoscopic study and treatment.

Surgical treatment to remove foreign bodies from the air passages had a mortality rate of over 27 per cent. Failures were common and in these, pulmonary suppuration with chronic invalidism was the usual outcome. With the bronchoscope the mortality rate is less than one per cent and failures are rare.

A few years ago the diagnosis of carcinoma of the bronchus usually was made by the pathologist in the autopsy room. Bronchoscopic biopsy has made possible a positive diagnosis in 60 to 80 per cent of the cases, and bronchoscopic anatomicopathologic findings warrant a diagnosis of carcinoma in an additional 10 to 15 per cent of the cases.

Techniques and instruments have been devised so that it is possible to diagnose positively a large number of cases of carcinoma when the lesions are beyond bronchoscopic vision. To date, attempts to treat bronchogenic carcinoma by endobronchial implantation of radon or by application of radium have not been successful.

The incidence of carcinoma of a bronchus is about ten times greater than that of benign tumor of the bronchus. However, the bronchoscope has proved valuable in detecting these bronchial obstructions. And many patients with endobronchial benign tumors have been successfully treated by instrumental removal and diathermy carried out bronchoscopically.

The bronchoscope was formerly used in the treatment of pulmonary abscess and bronchiectasis. With the advent of improved lung resection techniques, bronchoscopy remained of value only diagnostically. Still it has a place preoperatively and postoperatively in the care of the surgical groups.

In bronchial asthma the bronchoscope has a place in ruling out certain conditions that simulate asthma and to remove secretions from the air passages. Bronchoscopic or catheteral aspiration has a definite place in the medical management of all postoperative or post-traumatic conditions in which, for various reasons, the secretions cannot be coughed up from the air passages. They are well-recognized procedures which have contributed greatly in decreasing morbidity and mortality.

Diagnostic bronchoscopy in cases of pulmonary tuberculosis has revealed the frequent occurrence of tuberculous tracheobronchitis. There are no untoward effects resulting from bronchoscopy in tuberculous patients as was formerly believed. Routine diagnostic bronchoscopic examinations of all tuberculous patients will demonstrate tuberculous tracheobronchitis in about 10 per cent of the cases.

There is still some difference of opinion as to the value of endobronchial treatment of lesions of tracheobronchitis. Bronchoscopic cauterization, preferably employing silver nitrate, is most often done. The importance of bronchoscopic procedure lies in the recognition of tracheobronchial lesions which, if unrecognized or uncorrected, would seriously impair the benefits of collapse therapy.

There are many indications for bronchoscopy in tuberculous patients but only few contraindications. It should be considered as only one of a number of diagnostic measures and as a supplement to complete clinical and roentgenographic studies.

Bronchoscopy still offers the only method of treatment for removal of foreign bodies lodged in the air passages. It is a valuable aid in the diagnosis of obscure bronchopulmonary signs and symptoms and its outstanding contributions at the present time lie in this field.

Clerf, L. H.: *Progress in Bronchology*, *J.A.M.A.* 136:733-736 (*March* 13) 1948.

The Role of Glycerine

There is scarcely a branch of therapeutics in which glycerine does not play a part. In 1941, the last normal year for which statistics are available, about 6.2 per cent or 10,874,000 pounds of all the glycerine produced in this country was used to make drugs and pharmaceuticals. It is estimated that American hospitals use annually an average of more than three pounds of glycerine per bed.

Glycerine possesses a combination of physical properties which lend themselves to a wide variety of uses. It may be used as a humectant or hygroscopic agent, a vehicle, a sol-

vent, a sweetening agent, an emollient, a reactive material, a lubricant, a softening agent, a penetrant and as an antifreeze.

In sufficient concentration glycerine is useful as an antiseptic and as a preservative. Its viscosity lends body and it serves as an excellent suspending medium. Also, glycerine is valuable as a plasticizing agent.

Because of these favorable properties it is logical that glycerine demands an indispensable place in the medical armamentarium. In fact, in the war the British authorities rated glycerine as equal in importance to surgical instruments. Today it ranks sixteenth in competition with all medicines, including official and non-official remedies.

Glycerine used by itself or in simple admixture finds many hospital applications. Suppositories of glycerine stimulate bowel movement of bedridden patients. Lemon juice in glycerine is advocated to moisten the lips of feverish patients. Drops of warmed plain glycerine are often employed to relieve the pain of earache. The fluid also serves to soften and facilitate the removal of accumulated, hardened cerumen from the ear canal.

Mixtures of glycerine and rose water are among the most widely used preparations for relieving skin irritations and chapping. Many dermatologic pastes employ glycerine as an important component. It is frequently used to soften and clean crusts and scales and to combat hardness, dryness, and scaling of the skin.

In surgical treatment glycerine has important applications. It serves as a base for many of the newer drugs. Penicillin is being administered in pastilles or lozenges for local treatment of mouth and throat infections with glycerine as a base.

The hygroscopic property of glycerine constitutes a valuable adjunct to the chemotherapeutic process since it draws plasma from the deeper parts of wounds, thereby washing out micro-organisms and exposing them to antiseptic action. Its viscosity gives it the mechanical advantage of both the liquid and ointment types of medication. One of the special virtues is that it does not dry when used as a wet dressing in chronic infections.

A solution of 2 per cent compound cresol solution and 5 per cent glycerine in a mixture of equal parts of alcohol and water makes an excellent antiseptic and disinfectant solution. It is less expensive than commercial preparations used for sterilization of knives, scissors, and other instruments. The solution also prevents rusting.

As an antifreeze glycerine may be employed in ice bags and the like with a saving of time, effort, and equipment. For this purpose equal parts of glycerine and water give best results.

Of particular interest to the dentist is the use of glycerine as a lubricant for glass. Syringe pistons covered with it will not freeze. And long time protection is offered because it does not harden or gum as oils might. A mixture of equal parts of 90 per cent alcohol and glycerite of phenol may be used for storing hypodermic syringes previously sterilized by boiling. When the syringe is taken out of the mixture, the alcohol evaporates quickly, leaving behind a thin film of glycerite which not only keeps the interior of the barrel sterile but prevents the piston from sticking.

The penetrating and lubricating properties of glycerine may also be used to salvage syringes that have "frozen." Manufacturers recommend that, should the plunger become stuck, it can be released by boiling in an aqueous solution containing 25 per cent of glycerine. The same idea can be employed to release frozen glass stoppers, the warmed glycerine being allowed to seep in between the adjacent glass surfaces.

Leffingwell, Georgia, and Lesser, M. A.: Glycerine's Role in the Hospital, Hosp. Management 65:84-88 (*January*) 1948.

Leprosy

The majority of American physicians have never seen a patient with leprosy and the conception of this disease is rather vague and probably largely inaccurate. Many of our young men and women were undoubtedly exposed to leprosy in the tropics or Far East. Therefore, it is wise to know some of the facts concerning the disease.

Leprosy is a chronic infectious disease caused by Mycobacterium leprae. It involves principally the skin and nerves although the malignant type is systemic. The organism is an acid-fast bacillus which has neither been successfully cultivated nor inoculated into either man or animals. There are about five million victims in the world with the highest incidence in Asia, Africa, and Oceania. In America there are about 150,000 cases.

The disease is not hereditary; the children of a leper woman are always born free of the disease. It is communicable, with the organism finding its way into new victims via the nose or mouth and possibly the skin. An accidental or brief contact is not dangerous as it appears that *the transmission of a large number of bacilli over a long period of time is necessary for one to contract the disease.*

The malignant types are frequently incurable but the benign types show a tendency to a more or less slow spontaneous healing. Best treatment for the malignant types is general hygiene; namely, leper colonies, adequate food, and hygienic living conditions. For the mild types, chaulmoogra oil and its esters is an old remedy which affords relief. No new treatments have proved entirely satisfactory although encouraging results have been noted with promin, diasone, promizole, and streptomycin.

The Brazilian classification of the disease is the most acceptable to date as it is based on the pathologic changes in the tissues. Cases are designated as (1) lepromatous, (2) tuberculoid, and (3) indeterminate. Once the true type has been established there is never a change over to another type.

For the *lepromatous type* there is no sure cure; therefore the prognosis

is poor. Because of its systemic nature this form involves the skin and mucous membranes in the form of nodules of diffuse infiltration, the peripheral nerves, and most of the viscera. Skin lesions show a tendency toward generalization and symmetry and are especially apt to involve the exposed areas such as the face, ears, bony prominences and extensor surfaces of the extremities. The eruptions are variable but usually consist of numerous nodules which are convex, smooth, and bright copper brown. Partial alopecia of the eyebrows and the eyelashes is common. A chronic rhinitis is almost always present leading to sniffles, crusts, epistaxis, ulceration, and distortion. Blindness occurs in the later stages. Loss of weight, asthenia, anemia, digestive disturbances, involvement of the lymph nodes, testes, bones, and joints are characteristic.

Tuberculoid leprosy is the benign noncontagious form of the disease which appears in relatively resistant individuals and is capable of spontaneous healing. The condition is not systemic but is confined to the skin and nerves. Pathologically, it is characterized by a more or less typical tubercle formation with a central giant cell surrounded by epitheloid cells in a mantle of lymphocytes and small round cells. The bacillus is seldom found in the tubercle.

The lesions are asymmetrical with a special predilection for the eyelids, lips, palms, and soles. They are sharply defined and never ulcerate. Impairment of sensation is constant, persisting even after the lesions have involuted. The mucous membranes, eyes, and internal organs are not involved in the tuberculoid form of leprosy.

The *indeterminate cases* are neither lepromatous nor tuberculoid but in the course of time they may change to either form. Lesions are limited to the skin and nerves and appear as simple erythematous macules. These are found most commonly on the face, neck, extensor surfaces of the extremities, and the buttocks.

The clinical picture of leprosy is so variable that its diagnosis may be

easy or very difficult. The two most practical and fundamental tests are the search for the bacilli and the test for the impairment of sensation, particularly in the benign type. The sedimentation rate is greatly accelerated in the malignant type. No serologic test is of appreciable value in the diagnosis.

Leprosy is a social disease and its sensible solution depends largely on environment. Briefly, three principles should be practiced: (1) isolation in leprosaria; (2) protection during childhood, and (3) professional and lay education.

Shaw, Clarence: Leprosy, Am. Practitioner 2:338-341 (*January*) 1948.

Contra-Angles

Take It Easy . . .

I have just finished reading an article in *Hygeia* entitled THE FUTILITY OF HURRY.[1] I am impressed but presently a little supercilious about the whole thing because my labors of the moment consist of studying the light green spikes of new growth on the white pine trees and gazing at the purple haze over the far-off hills. My dog has just sprung to action to beat off a bumble bee that was out of bounds. She has resumed her relaxation at my feet. She needs no articles describing the futility of hurry; in fact, she knows more about relaxation than the learned fellow who wrote the article in *Hygeia*.

It is only a few days ago that I was showing tension and annoyance at the dental chair or sitting in a hard seat at some dental meeting listening to a scirocco of hot air. I like practicing dentistry and I enjoy the association at most dental meetings. But that

[1]Gray, A. W.: The Futility of Hurry, Hygeia 26:400 (June) 1948.

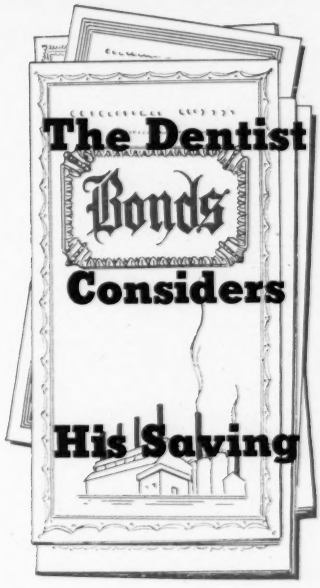
doesn't prevent me from getting deadly weary of both. Practicing dentistry is hard work. So is losing sleep; sitting in stuffy rooms drinking, eating, and smoking too much at dental meetings. But the hardest work of all is to live under the tyranny of the clock and the timetable. We practice by appointment; we have to catch a certain train at a certain time; the meeting begins punctually at eight (or at least it should). If we don't keep an eye on our watch, we are too late for something on the radio (which is usually no loss).

Hurry is harder than work. The muscles that are tight from tension are more fatigued at the end of the day than the muscles that are sore from work. The heart beats faster and the breath comes harder when we hurry under the compulsion of the timepiece than when we are in action on the tennis court or in the swimming pool (or at least the strain doesn't wear off as fast as after pleasant exercise).

Some people are habitually late getting up, going to bed, keeping appointments. These people are usually as tense as a bowstring, ready to snap at everybody at all times. Mr. Gray, the author of the *Hygeia* article, quotes the observation on hurry made by the sagacious William James: "By the sensations that so incessantly pour in from the overtense, excited body, the overtense, excited habit of mind is kept up; and the sultry, thundering, exhausting inner atmosphere never quite clears away. If you never wholly give yourself up to the chair you sit in, but always keep your leg and your body muscles half contracted for a rise, what mental mood can you be in but one of inner panting and expectancy and how can the future and its worries possibly forsake your mind? On the other hand, how can they gain admission to your mind if your brow be unruffled, your respiration calm and complete, and your muscles all relaxed?"

Physiologists, notably Jacobson, have shown that moderns are so tied up in knots that they need a guide book to teach them how to untangle themselves. Jacobson has written a fat book on progressive relaxation that

In your ORAL HYGIENE this month



According to Doctor M. R. Stern, there's a time to buy stocks and a time to buy bonds—a time for speculation and a time for conservative investment. His article should help any dentist "make the most of his money."

★ ★ ★

"Controlling Pain in Cavity Preparation"—Doctor Herman Brody gives a formula for an anesthetic which may be used to produce a profound analgesia effect upon sensitive dentine, and recommends the use of this compound in cavity preparation and preparation for three-quarter crowns and porcelain jacket crowns.

★ ★ ★

"Courtesy—The Catalytic Agent"—Doctor Neil Edward Reardon explains courtesy as one of the chief ingredients of any dentist's success, and one of the main factors in building good will for a dental office. Perhaps the moments you spend in reassuring explanation of proposed dental treatment are more important to the growth of your practice than the hours you spend in actual operative work.

★ ★ ★

This is no time to delete the Committee on Military Affairs of the American Dental Association, protests Doctor Emil H. Bollwerk, president of the National Dental Veterans League. With dentists uncertain of their status under a Selective Service law, and with the "production dentistry" of the past war fresh in their minds, all members of the Association should act to keep the Military Affairs Committee alive—and active. You will want to read "Veterans: Are You Ready to Return to Service?" It is an article that pulls no punches.

★ ★ ★

Now they're giving postgraduate courses by telephone! Joseph P. O'Brien tells about the several telephone methods by which a dentist can "attend" school, hear a lecture, or enter into a discussion. Your dental society may be interested in sponsoring such a course.

★ ★ ★

"Health is Everybody's Business"—is an interesting report on the National Health Assembly, convened to study the medical and dental needs of all of the people. While "nothing startling came out of the Assembly," dentists will want to read the specific recommendations which were offered by the section on dental health.

CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 320 *and* 321)

Form to be Used by Contributors

To: Clinical and Laboratory Suggestions Editor
DENTAL DIGEST
708 Church Street
Evanston, Illinois

From: _____

_____

Subject: _____

Explanation of Procedure:

Sketch:

$10 will be paid to author on publication of accepted suggestions.

tells them how to untangle their muscle groups one by one. Spading the garden, walking several stiff miles, doing too many energetic dance steps, are natural ways to get sore muscles. Nobody ever got himself sick from this kind of good muscular action. But waiting, tense, for a telephone to ring or not to ring throws more strain on the neuromuscular tissues than cutting a cord of wood. Well, maybe not a cord; but a basket of wood.

Fussing about the partial denture that doesn't quite want to fit, sweating it out over a fractured root, would not be classed as forms of manual labor but any dentist knows that this is work that beats one down lower than swinging an ax or a scythe.

But why am I writing all this when I have my job of concentrating on the new growth of pine trees and the cloud formations over the far-off hills? Pardon me while I join my dog for a nap on the grass.

A Quack Defined . . .

We are, every one of us, inclined at times to hand out a bit of bunk and hokum to our patients. We imply, suggest, or discreetly get the point across that we are pretty good and competent guys. That is not quackery; it is just a touch of human weakness that shows that we are craving for recognition and approval. Everybody wants that. There are, however, out-and-out quacks in dentistry, many of whom are members of dental societies and not an insignificant number who have been officers in their dental organizations. They are ethical to the *letter* of the code: They do not peddle handbills, flash neon signs, or have a big gold tooth hanging over their office entrance. They are quacks in the *spirit* of the code because they undermine the reputation of their colleagues by the lifting of the brows or a damning tone of voice when they examine the dentistry done by someone else. They are quacks because they never say, "I don't know," but give a dogmatic answer to every query raised. They are quacks because they imply that they have

(*Continued on page* 332)

TYPICAL COMMENTS WHICH MADE A NINTH REPRINTING NECESSARY . . . .

"Your Visual Education in Dentistry is very helpful to me in daily practice. My copy is worn badly. Can I secure another?" S.J.L., Mass.

"Would you please send me 2 copies of Visual Education in Dentistry? I have a copy on hand now but it is pretty well worn from everyday use. It has been quite helpful to me in describing to my patients what happens to teeth through neglect." W.J.J., Mich.

"I found your booklet Visual Education in Dentistry so helpful that I'd appreciate two more copies for my waiting room. Here is my check." A.W., N.Y.

"I find that Visual Education in Dentistry is very well received by my patients, many of whom speak voluntarily of it. My present copy has become worn out thus making it necessary for me to order another." R.M.S., Mass.

"Visual Education in Dentistry" is of inestimable value in bringing dentistry to the patient so that he may be helped to understand the efforts of a thorough and honest dentist. A copy should be in every reception room and another in each operatory." J.T.C., La.

"I found your booklet, Visual Education in Dentistry, so helpful that I'd appreciate two more copies for my waiting room. Enclosed you will find a check for $2 which I think covers cost." Dr. A.W., N.Y.

"A short while ago I subscribed to The Dental Digest and paid $1 for a copy of Visual Education in Dentistry. I have found this booklet so valuable in my practice. I notice the pages are becoming frayed around the edges. Therefore, I am enclosing $1 for another copy to replace the present one." Dr. O.B.V., Tex.

"I have had a copy of your Visual Education in Dentistry in my reception a room for some time and have had sever l requests from physicians for a copy. I would appreciate your sending me five (5) more copies for which my check isy enclosed. May I take this opportunit- to state that there is no other publi cation in my office that receives as much wear and tear as this chart booklet." Dr. J.H.B., Ill.

Visual Education in Dentistry is more widely used in patient-education programs in dental offices than any other material of a similar nature. Surely there is a reason why the sale now totals over 85,000 copies!

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Many practitioners are ordering two copies . . . for reception room and operatory use. Here is an ethical way of spreading patient-education material of recognized value.

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Dr. .....

Address .....

Dealer .....

(*Continued from page* 328)

superior knowledge, skill, or technique that is not possessed by the ordinary run of mortals practicing dentistry.

The fine spirit of a profession requires that a man give as well as receive. He gives whatever knowledge he has gained, only asking as his reward that he receive proper recognition in the records of his profession. Dentists often forego their personal pleasures and at their own expense give clinics and lectures to their colleagues. Almost without exception the dentist who has made a significant discovery is anxious to share it with his fellows. Many of these men have invested thousands of dollars in experiments and equipment and countless hours in study and hard work. A few of them have been grasping and have shown more interest in a balance sheet than in a scientific contribution. But the greatest number have made an unselfish contribution and the public and the profession are forever after in their debt.

A little discipline of self-examination is something that we should all experience from time to time. It is so easy, looking for the mote in our neighbor's eye, that we fail to see the evil in our own. Each one should try this definition of a quack in the *British Medical Journal* on himself: "A quack may be defined as a person who seeks to establish a quasi-professional relation to a client (or patient) without having first submitted himself to a course of training regarded as adequate by the teachers in that profession; who makes no consistent endeavour to integrate any discovery he may make in the exercise of the profession with the body of knowledge already existing—to the end that the range of experience of the next generation of students may be improved; who, when in a difficulty with diagnosis or treatment, does not call in a brother-practitioner, laying before him all the facts known, being ready to accept the advice offered, or who would not be willing, if called in by a brother-practitioner, to put his experience fully at his disposal and return the patient to his own practitioner, not trying to keep him for himself; and who is unwilling to submit himself to the discipline of the organizations of his profession in matters affecting his ethical relations to his patients.

"The definition turns on four things: on the willingness to learn in due humility from an older generation, to give without arrogance to the next generation, to treat one's own generation with generosity as equals, and to submit to a social code.

"Most of the articles on quacks and quackery enlarge on the practitioner-patient relationship; ought not more consideration to be given to the relation existing between persons in the same field of social activity —namely, brother practitioner?"

How well did you rate yourself? Perfect? Well, if you did, then the world is not the place for you. As the radio announcers beseech: 'Remember! Send for your wings *today*."—E.J.R.